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DISRAELI KOBAK, M.D., Editor

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PROGRAM NUMBER

ORIGINAL ARTICLES

•

EDITORIALS

•

SPECIAL SECTION

•

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•

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VILLOUS SYNOVITIS OF THE KNEES DUE TO IMPROPER WEIGHT DISTRIBUTION *

WILLIAM HADDEN IRISH, M.D.

and

JOHN P. STUMP, M.D.

NEW YORK

Improper distribution of body weight is generally recognized as a cause of painful synovitis of the knee, but like many common conditions, is repeatedly overlooked. In our experience this type of chronic synovitis is such a frequent cause of pain and disability and so often neglected, that we feel it is worthy of detailed attention. The majority of our patients have "gone the rounds" and their condition has been misdiagnosed as injured cartilages, "joint mice" and arthritis. They have been treated by various measures ranging from diathermy and tonsillectomy to arthrotomy, but all too few have been asked to remove their shoes to be examined for foot distortion.

In the literature we find only brief references to synovitis of the knees due to faulty weight bearing. Whitman[1], in discussing incidental synovitis, states — "discomfort about the knee is not infrequently an accompaniment of the weak foot." Jones and Lovett[2] observe that "synovitis may occur in the knees at times in connection with static disability of the feet." Shands[3], discussing weak feet, says — "occasionally synovitis of the knee develops as a result of mechanical relationships in the feet and legs." However, Bennett[4], in a review of the etiology of 750 cases of synovitis of the knees with effusion, does not mention static strain. In 1909, Ogilvy[5], discussing inflammation of the knee joint, described villous arthritis (synovitis) resulting from

Fig. 1 Fig. 2

Fig. 1. — The weight bearing line is correct and there is no abnormal stress on the internal lateral ligaments.

Fig. 2. — The same patient as shown in figure 1. The weak feet cause knock knees which put abnormal stress on the internal lateral ligament. Strain on this ligament is the primary etiological factor in villous synovitis due to faulty distribution of weight.

* From the Orthopedic Department of the New York Post-Graduate Medical School and Hospital.

* Read before the Seventeenth Annual Session of the American Congress of Physical Therapy, Chicago, September 15, 1938.

weak feet. This last publication is the only reference found which emphasizes direct association between villous synovitis of the knees and weak feet.

Figures 1 and 2 show how weak feet cause resultant knock knees and put abnormal strain on the internal lateral ligaments. This strain is transmitted through the joint capsules causing traumatic irritation of the synovial membranes.

We might mention briefly the anatomic relationship of the knee joint before discussing the manner in which mechanical strain causes hypertrophy of the villous formation of the synovial membrane. The structure of the knee is such that the weight should be transmitted from the articular surfaces of the condyles of the femur to those of the head of the tibia, cushioned and balanced to some extent by the semilunar cartilages. Further balance is maintained by the lateral and cruciate ligaments, the joint capsule, the hamstring muscles posteriorly and the quadriceps femoris muscle anteriorly. Of utmost consideration in this presentation is the relationship of the synovial membrane to the lateral ligaments. The synovial membrane is firmly attached to the capsule, but the relationship of the lateral ligaments is not so uniform. The external lateral ligament in passing from the femur to the fibula is separated from the joint capsule. The internal lateral ligament adheres firmly to the capsule — in effect, this ligament, the capsule and the synovial membrane form one structure. This relationship is indicated in figure 3. Hence, any strain on the internal lateral ligament acts through the joint capsule to cause strain and irritation of the synovial membrane.

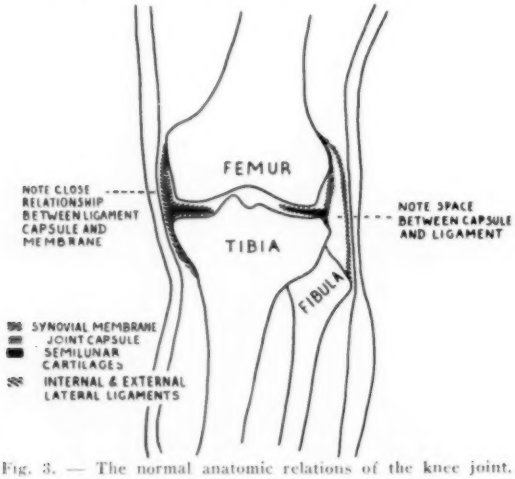

Fig. 3. — The normal anatomic relations of the knee joint.

Pathogenesis

In patients with weak and distorted feet, the weight bearing line is thrown from its center, bringing about abnormal stress on the joint capsule, the muscular supports, the cruciate and particularly the internal lateral ligaments. The close relationship of the cruciate and internal lateral ligaments to the synovial membrane causes that membrane to be constantly irritated by the repeated trauma produced by the strain of weight bearing. The synovial membrane is the tissue of the knee which first responds to irritation. This irritation sets up an inflammatory process resulting in hypertrophy of the membrane with proliferation of the villous formation. Figure 4 demonstrates the manner in which the internal lateral ligament is put on a strain when distorted feet throw the body weight to the medial side of the knees, and indicates the nature of the hypertrophy and the proliferation of the

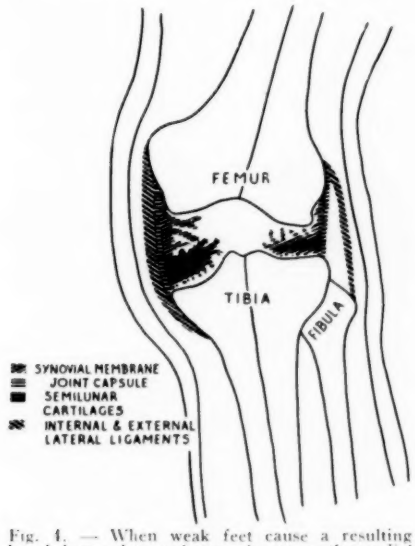

Fig. 4. — When weak feet cause a resulting knock knee, abnormal stress is put on the medial supports of the joints, causing strain on the internal lateral ligaments and irritation of the synovial membrane.

villous formation of the synovial membrane. This process is well described by Shands[6] as follows: "Hypertrophy of the synovial villi is a frequent result of chronic intra-articular inflammation. The villous processes become enlarged and elongated and occasionally form lobulated masses which have been called arborescent lipomas. This affection is a localized form of villous arthritis." The hypertrophied synovial membrane is the posterior compartment of the knee and the suprapatellar pouch, shown in figure 5, explain the pain in the popliteal space and crepitation in front and above the knee joint. As the villi become enlarged, they are further subjected to trauma by being compressed between the articular surfaces of the femur and the tibia. During this vicious process the ligamentous supports, which respond more slowly to irritation than the synovial membrane, become inflamed and thickened and account for the enlargement and thickening seen in advanced cases.

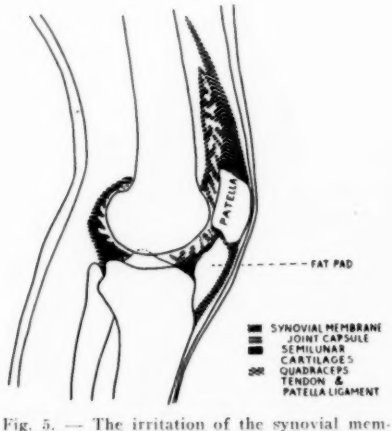

Fig. 5. — The irritation of the synovial membrane is general and causes hypertrophy and proliferation of synovial villi throughout the full extent of the membrane.

In obese individuals the excess weight causes additional stress on the soft tissue supports of the knees, while in asthenic patients the poorly developed and relaxed muscles and ligaments permit increased strain and, hence, added irritation of the synovial membrane. Any focal infection tends to intensify the inflammatory reaction.

X-ray examination of the knees often shows no change from the normal, but frequently there is thickening of the soft tissues and haziness of the joint space, the latter suggesting increased density of the synovial membrane. If changes in the osseous structures exist, they are of the hypertrophic or osteoarthritic type. With hypertrophic changes it is essential to evaluate the probability of osteoarthritis causing the symptoms, and not to consider the patient as having uncomplicated villous synovitis.

We have long since ceased to operate on this type of knee, so that we are unable to offer pathologic material. However, at the time we did operate, the findings were increased thickness of the subcutaneous tissue, hypertrophy of the ligaments, little change in the joint capsule and marked hyperemia, hypertrophy and fibrosis of the synovial membrane with pronounced and extensive synovial villi. It is important to note that there never was evidence of disturbance of the contents of the knee joint. Dowd[7] and Ogilvy[5], report identical operative findings in patients presenting the same clinical symptoms and Fisher[8] describes similar findings in the synovial membrane in untreated cases of semilunar cartilage injury. It seems safe to assume that any surgeon who has operated upon a chronically inflamed knee joint has observed the pathologic changes typical of villous synovitis.

Symptoms and Signs

Villous synovitis is seen in all body types and at all ages. The definite characteristics are: pain; disability; thickening of the knees; articular crepitation; improper distribution of body weight; insufficient bone changes by x-ray to account for the symptoms, and most striking is the return of the knees to normal when the body weight is properly distributed and abnormal mechanical stress and strain eliminated.

The symptoms are insidious and progress over a period of months or years. Occasionally the patient first notices crepitation on motion, but generally the symptom which causes him to seek aid is pain. The pain may be diffuse, but in adults it is more often localized just in front of the lateral ligaments or in the popliteal space. Pain is increased on walking and standing, and most severe when the knee is extended, particularly in descending stairs. Following rest, the knees are stiff and the first movements are apt to cause excruciating pain. Not infrequently the patient is conscious of instability and states that the "knees give way" when unguarded walking is attempted, especially after a rest period. Questioning usually elicits other symptoms of foot strain.

In the early stages the clinical examination is not definite and a cursory review shows little, but a detailed examination reveals beginning thickening of the soft parts of the knees, chiefly of the synovial membrane. Fine grating — different in feel from the crepitations of bone — will be present. In children, increase in synovial fluid is occasionally seen, while in adults, it is rare. Motion will be guarded but not limited and tenderness might be present.

As the condition progresses, the subcutaneous tissues become quite thickened and the knees large and misshapen, giving the impression that there are nodular exostoses on the femur and the tibia. There is no edema. At this stage there might be clinically demonstrable fluid, but even here adults rarely show increased synovial fluid. The hypertrophied synovial

membrane can unquestionably be palpated and the fibrotic villi become so prominent that one is apt to think they are "joint mice" or a displaced cartilage slipping in and out of the joints. As the process continues, normal motion and security of the joints become embarrassed. Tenderness increases and the location of the tender spots changes from time to time, but most frequently are felt just in front of the lateral ligaments. Lateral instability is not pronounced and locking rarely takes place. Crepitation is perhaps the most striking objective finding and is often advanced to a real grating to such an extent that one is surprised when the x-rays do not indicate extreme destruction of the articular cartilage. In many cases this crepitation can be heard when standing a few feet from the patient while he moves his knees. Finally, all patients show moderate or severe deviation from the weight bearing line, and the majority have marked midtarsal pronation.

Fig. 6. — A middle aged female with typical villous synovitis of the knees due to improper distribution of weight. Note that the postural distortion need not be severe. This patient was completely relieved by correcting her weak feet.

Figure 6 presents a rather typical picture of a middle aged lady with villous synovitis of the knees due to weak feet. This case illustrates the fact that frequently the postural distortion is not severe.

Rarely does villous synovitis suggest that the inflammatory process is infectious in origin. Acute sprain or fracture is usually apparent from a history of violent trauma, abrupt onset and x-ray findings. The differentiation from injured cartilage or "joint mouse" might be difficult; but if doubt exists, the therapeutic test described below will usually solve the problem promptly. The chief differentiation must be made between villous synovitis and arthritis. Here the confusion is often intensified by finding an increased sedimentation rate and blood chemistry changes due to a concomitant condition, or by x-rays showing the hypertrophic bone changes of senility. A history of long duration with gradual progression of symptoms, changing areas of pain and tenderness, palpation of hypertrophied synovial tabs appearing at different parts of the knee on repeated examination, pain in the popliteal region on extension of the joint and distortion of the weight bearing line are sufficient to confirm the diagnosis of villous synovitis due to faulty distribution of body weight. If any doubt remains, firm adhesive tape strappings, holding the feet in dorsi-flexion and inversion, will usually give dramatic relief of symptoms within two or three days.

Relationship to Arthritis

The relationship of this type of synovitis to arthritis is emphasized because of the great number of these cases treated for months as rheumatism without benefit. Villous synovitis is neither rheumatoid arthritis nor osteoarthritis. The chronically inflamed synovial membrane affords a fertile field for the onset of rheumatoid arthritis if other etiologic factors are present. If these knees are neglected they will invariably progress to osteoarthritis. Synovitis due to static strain may complicate rheumatoid arthritis. More frequently, one sees a person who has recovered from a generalized arthritis continue to suffer from his knees until the faulty weight bearing is corrected.

Treatment

When the diagnosis of villous synovitis is established, the first consideration is to overcome the strain on the supports of the medial sides of the knees. As these joints are inflamed and painful, the correction must be accomplished by passive treatment which generally requires the use of foot plates and correct shoes to force the weight away from the inner side of the joints. Constitutional factors are given full consideration. Obesity is corrected. Foci of infection and intestinal stasis are treated. In young individuals and mild cases exercise is instituted to increase muscle development and tone. In older individuals and advanced cases, the motion of the joints required by exercise increases the discomfort. While we meet an occasional stubborn case, the most characteristic result of treatment after the faulty posture is corrected, is subsidence of the subjective symptoms and return of the joints to normal before sufficient time has elapsed for the patient to reduce his weight or have his foci of infection removed.

Physical therapy affords three exceedingly important measures in the treatment of villous synovitis: relief of pain, muscular development to supply increased support of the knees, and correction of postural distortions. Deep heat should be used early, as it gives relief of pain and influences the inflamed tissues to return to normal. Muscular development, particularly of the quadriceps femoris, provides support and stabilization of the joints. In children and in adults with mild involvement, active, supervised exercise without weight bearing, accompanied by massage of the thigh and calf can be instituted early. In adults and advanced cases, active motion will be followed by aggravation of the symptoms and retardation of the progress. In the latter group one must remain content with the use of deep heat and massage of the muscles, avoiding massage of the joints. After the symptoms have subsided, the all important correction of the patient's posture by proper use of the muscles can be instituted. Only in this manner can a complete and lasting cure be obtained.

Summary

Improper distribution of weight due to weak feet causes synovitis of the knees, characterized by hypertrophy and fibrosis of the synovial villi and hypertrophy of the subcutaneous soft tissues about the knee joints. Correction of the weak feet results in complete relief of subjective symptoms and a return of the knee joints to normal. Physical therapy is used not only for palliation, but for the all important development of muscle and muscle tone and correction of faulty posture.

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(*Concluded on page 405*)

PHYSICAL THERAPY OF FRACTURES MANAGED BY UNPADDED CASTS *

LOUIS KAPLAN, M.D.

PHILADELPHIA

Every fracture and dislocation should be regarded not only as an injury to bone or joint, but as involving ligaments, muscles, blood and lymph vessels and nerves. Hemorrhage from torn vessels occurs. An inflammatory reaction follows hemorrhage and death of damaged cells. Edema also takes place, due in part to tension in the tissues with slowing of the lymphatic and venous return, and in part perhaps to local vascular reflexes. Necrosis to some extent occurs also in the bone at the line of fracture.

Osseous union appears to begin with organization of the clot about the fracture. An osteoid matrix then forms accompanied by calcium deposition. At this time we have callus. Later the callus becomes organized with the formation of true Haversian bone.

Methods of Immobilization

Splints and casts serve to maintain alignment of the fragments and to limit the motion of the surfaces of the fragments on each other. No splint or cast yet invented gives absolute immobilization. Even the most rigid form of internal fixation will allow some play.

Union is favored when the motion of the fragments in relation to each other does not exceed a certain small range. When motion of the fragments is sufficiently limited we obtain a state of "adequate immobilization." This may be obtained by traction and suspension, the whole body being more or less immobilized by the rest in bed. Another method is the application of a splint or padded cast, no use or weight bearing of the extremity being permitted. Immobilization of certain fractures may be had even with active use of the extremity if the cast fits the bony contours with sufficient accuracy and snugness (figs. 1, 2). In other words, the less accurately the cast fits, the more the extremity must be immobilized to compensate for it. In general, the basic requirement for a good bony result is adequate uninterrupted immobilization of the fragments until consolidation occurs.

It has been demonstrated that immobilization of an extremity, even in the absence of fracture, has an adverse effect upon the bone and soft parts — atrophy of disuse. Bone decalcifies, muscle atrophies, ligaments and joint capsules shrink, and the blood flow diminishes. When an extremity is immobilized for fracture this harmful effect upon the soft parts is increased by the presence of dead tissue, blood clot and exudate. These elements are partly absorbed. Partly they undergo organization with fibrous tissue formation, resulting in (1) adhesions between muscular and fascial planes, (2) retardation of venous and lymphatic return.

Everyone is familiar with the appearance of a leg after two to four months encasement in plaster — thin muscles, stiff joints, subcutaneous induration and persistent edema.

Until recent years splints and casts have been used in two forms in fractures of the extremities: (1) The padded cast with no active use and little

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* From the Surgical Out-patient Department, Hospital of the University of Pennsylvania, and from the Surgical Service of Dr. Benjamin Lipshutz, Mount Sinai Hospital, Philadelphia.

* Read at the Spring Session, Eastern Section, American Congress of Physical Therapy, Under the Auspices of the New York Physical Therapy Society and the Pennsylvania Physical Therapy Association, Philadelphia, April 22, 1939.

A B

Fig. 1. — *A*, unpadded cast from the knuckles to the axillary fold. The cast extends only from the knuckles to the crease at the elbow for fractures at the wrist; *B*, cast for metacarpal fractures (technic to be published).

or no physical therapy until its removal. Usually there were pronounced soft tissue changes, and heating, massage, passive motion, hydrotherapy, and the like had to be continued for a protracted period of time. (2) Removable splints and casts with no active use and with physical therapy at intervals. The soft tissue changes were to a greater or lesser extent prevented, but only at the risk of displacement of the fragments and with a great deal of time consumed in treatment.

During the past few years we have begun to realize that much of the soft tissue damage is produced not by injury but by immobilization. Particularly is this true in elderly patients. Immobilization of the whole hand for Colles' fracture for three or four weeks in a sixty-year old patient, to cite an example, will make it so stiff and painful that even the most intensive after-treatment may only partly ameliorate the condition. Much of this is true for the shoulder.

Methods Permitting Maximum Activity

We have therefore attempted to devise and use methods which permit maximum active use of the extremity, while maintaining adequate immobilization of the fragments, following more or less the methods of Böhler.[1] One may summarize the advantages of these methods as follows:

1. Maintenance of a good circulation — capillary effect of exercise.
2. Prevention of muscle, bone and joint atrophy.
3. Diminution of fibrosis and adhesions.
4. Improved morale.
5. Ability to carry on work of many kinds: housework, commercial work, painting, carpentry.
6. Less need for formal physical therapy.

The prime object of physical therapy is to increase circulation by local heating, to maintain muscle tone and to disperse edema and exudates by massage, and thereby to diminish the ill-effects of trauma and immobilization on the soft parts.

It has been demonstrated, by Goldschmidt, Light, and Bazett,[2] in 1925, that exercise increases the capillary circulation almost to the same extent as intense heat; therefore a patient who is given heat three times a week gets much less local circulatory stimulation than one who can exercise the part all day long. With good circulation, the ischemic changes in bone, joint and muscle are much diminished. It is striking to note the mobility of an ankle

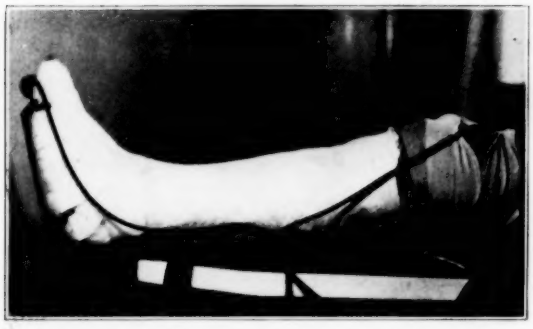

Fig. 2. — Diathermy — tin electrode inserted between sole of foot and cast, upper electrode fastened with bandage.

joint after 8-10 weeks immobilization if the patient has been walking his daily mile. Good circulation increases the absorption of clot and exudate and abolishes edema, resulting in lessened fibrosis. With active use, the reflex muscle contractions diminish adhesions and maintain tone. The effect on morale is excellent. The patient who is started on active exercise 3 or 4 days after fracture loses the fear of remaining crippled. Many of these patients can return to their duties within a few hours after the application of a cast. This avoids much hardship in homes where the mother takes care of children. Many workmen can return to part or full time work. Finally the burden of a great number of treatments and expense is lifted from the physical therapy department of the hospital.

The plan of treatment for fractures of extremities in good position is: (1) Accurate splinting (wood or plaster); (2) snug pressure bandage to control swelling; (3) x-ray examination; (4) elevation and rest; (5) ice bags for 24 to 48 hours after inury.

Fractures in poor position are given the following immediate care: (1) Accurate splinting (wood or plaster); (2) snug pressure bandage to control swelling; (3) x-ray examination; (4) reduction; (5) molded plaster splints; (6) snug pressure bandage to control swelling; (7) elevation and rest; (8) ice bags for 24-48 hours after injury.

In both types as soon as the swelling has subsided (usually from 1 to 5 days depending on the severity of the injury) the splints are removed and an unpadded cast is applied if there is no likelihood of displacement of the fragments. Occasionally, cases difficult of reduction or of retention have only the pressure bandage removed, when a circular plaster cast is applied over the splints. In applying the plaster we insist upon — (1) accurate molding over the bony contours; (2) sufficient length to immobilize and to permit active motion or weight bearing without pain; (3) no more weight or length than necessary. Active motion is started as soon as the plaster is hard and dry.

With elbow and forearm fractures the cast extends from the axilla to the knuckles (fig. 1, A). Full shoulder and hand motion is insisted upon from the beginning. The patient is urged to do anything that he wishes to; carpentry, painting, lifting weights and the like.

With wrist fractures such as Colles' or carpal scaphoid, the cast extends from the crease of the elbow to the knuckles. For metacarpal fractures a recently devised cast[3] extends from the lower third of the forearm down to include the proximal half of the corresponding finger, the other fingers being left free (fig. 1, B). Active use is insisted upon from the beginning and no form of activity is prohibited. No slings are used for arm frac-

tures after application of the cast. Elderly patients who may have difficulty in lifting the arm above the head are advised to swing the arm in the stooping posture. "The more you use it the sooner you get well."

For lower extremity fractures we use the following types of casts — (1) toes to knee — for foot and ankle fractures (fig. 2); (2) toes to upper thigh — for tibial shaft fractures; (3) toes to tuberosity of ischium — for fractures about the knee joint.

In the first two a strip of felt is glued to the skin over the tuberosities of the tibia, just below the crease of the knee. This bony area bears most of the weight. In the third type a strip of felt covers the tuberosity of the ischium and the perineum. Weight is borne on the tuberosity. A walking iron, shoe, felt pad (fig. 2), or section of rubber tire protects the sole of the cast.

The patient is started walking and weight bearing with the help of crutches or a cane. After a few days they are usually discarded. The patient is instructed to walk at least one mile daily. "The more you walk the sooner you get well." He is urged to walk up and down stairs and to return to his regular work, provided it does not require exacting use of the leg, such as in driving a truck. I have had some patients who drove their automobiles with a knee-length cast. The casts which usually remain in position until union is solid (6 to 12 weeks), rarely require replacement and seldom cause pain. In previous years casts were removed early to permit the application of heat and massage. At present removal before solid union occurs will only tend to defeat our purpose.

Indications for Physical Therapy

When for any reason an adequate amount of exercise cannot be performed, as in very advanced age, cardiac disease or intercurrent illness, the exercise may be supplemented by either long or short wave diathermy. My experience has been with classic diathermy. The electrodes may be applied at both ends of the cast (fig. 2), or may be incorporated in the cast. It would be well to remember the warning of Dr. Clay Ray Murray concerning excessive heating, and to be content with a current not exceeding 250-300 milliamperes in most patients.

Short wave diathermy has been used by one physician of my acquaintance, with electrodes placed on each side of the cast. He believes that there is satisfactory heat production in the tissues. I have no personal experience with the method, but it would seem that caution should be exercised to avoid overheating and burns.

Other indications for physical therapy may be present, such as crushing or division of nerves, with sensory or motor changes. The usual forms of muscle stimulation may then be indicated and windows should be cut in the cast to permit approach. The trophic changes which follow division of a nerve, such as the median, may be accompanied by sensations of extreme cold in the fingers. A recently published concept is that this may be due to excessive vasoconstriction. A hot air chamber would therefore be useful. Mecholyl iontophoresis might also be indicated. When repeated, free access to a part is necessary, some form of removable splint or cast is preferable to the usual unpadded cast.

After removal of arm casts the joints can usually be moved through half their range almost immediately. The usual treatment consists of instruction to soak the part in hot water for ten minutes, to be followed by a brisk rub with a mild rubefacient ointment (such as methyl salicylate 2 drams, petrolatum to make 2 ounces) followed by joint stretching to the

point of slight pain. This is repeated twice or three times daily and is continued until a maximum range of motion is obtained.

After removal of lower extremity casts the ankle can usually be moved immediately through half its normal range, and the knee (if it was immobilized) through one-fourth or one-third of its normal range. There is commonly present some edema of the leg and foot and slight weakness of the foot. A gelatin boot (Unna's zinc-gelatin paste) or an elastic adhesive bandage (such as elastoplast) gives local support to the soft tissues and prevents edema. Insertion of a wedge of 1/8 to 3/16 of an inch in the medial sides of the heels lessens the strain on the weakened foot. When considerable pain and stiffness are present, as in multiple fractures of the ankle and foot, a non-adhesive elastic leg and ankle support is used (elastic bandage, elastic anklet, or elastic stocking) so that the part may remain accessible to physical therapy. Commonly hot soaks and methyl salicylate ointment are prescribed as for upper extremity fractures. Heat and massage, especially of the knee, are occasionally very helpful. Warm baths at home, with exercises in the tub, are sometimes useful in very weak patients. Special indications may be present for other physical therapeutic agents.

As a rule the physical therapist will be called upon less frequently than before to give routine treatment to these patients. When consulted, it will be more for the purpose of prescribing, instructing and supervising the patient's self-treatment, much as physicians and dietitians supervise diabetic patients. He should instruct the patient on the following points, and should demonstrate when necessary — (1) proper temperatures and mechanical conditions for home treatment, such as hot soaks; (2) proper methods of massage; (3) graded exercises and methods of increasing the range of motion of joints; (4) forms of home occupational therapy. Specialistic physical therapy will, of course, be continued whenever necessitated by particular complications, but with the following considerations: (1) The more the patient does for himself, the better; (2) whenever a home substitute can be devised for special treatment, it should be used; (3) home treatment three times a day is likely to be more effective than clinic treatment three times a week; (4) the patient should be taught to take pride in the improvement he is able to produce by his own efforts.

Summary

A method of treatment for fractures of the extremities has been described. It is based on:

1. The ability to obtain a high degree of immobilization by unpadded casts.
2. Active use as a therapeutic agent.
3. Teaching the patient to be his own physical therapist.
4. The beneficial effects of heat, massage and exercise under proper supervision.

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ULTRAVIOLET IRRADIATION IN CORNEAL ULCERS *

ELLIS G. LINN, M.D.

DES MOINES, IOWA

I am again urging more general use of ultraviolet irradiation as a measure from which positive results may be expected in the treatment of corneal ulcers. Any abrasion of the corneal surface or any penetration of the corneal structure, leaves this tissue practically defenseless. The corneal substance proper offers a natural resistance, observable in every such misfortune. Fortunately not every abrasion or denuding of the corneal surface carries or is exposed to infection. Fortunately the excess tears induced, afford much protection against bacterial invasion in these situations. In every case of even superficial abrasion, however, and in every laceration of the deeper corneal layers, there is the well grounded fear of infection.

As is generally known, the flat superficial epithelial cells offer very definite resistance to invasion of the frequent types of infection. There is still a question as to whether the Recklinghausen canals make deeper invasion of the tissues more easy to infective processes, but the corneal structures must be regarded as almost ideally resistant when not subjected to abrasion or other harm from without.

It is generally conceded that aside from invasion by the gonococcus or the diphtheria bacillus, there is rarely a corneal infection unless it follows an abrasion or a definitely lowered systemic resistance.

It is extremely unfortunate that the more nearly central the corneal lesion, the less effective the defense and the more tardy the essential repair. Not only is the nerve function involved in defense, burdened to or beyond its capacity to master the attack when the invasion is marginal, but when centrally located, the defense is in every way more prone to break down.

Local Circulation

With a circulation ample for the healthy normal corneal structure, it very definitely has to be immediately reinforced and built up when any considerable abrasion occurs or when it is attacked by bacterial invasion. This is more particularly true in invasion of the central corneal area where the defensive mesures are at a distinct disadvantage. The rapidity of tissue destruction does not differ greatly in the marginal, from that of a central corneal ulcer.

There is a hypervascularity early developed and active about the corneo-scleral margin, with evident rapid advance toward the lesion. There is too, observed about the point of trauma or abrasion or breakdown in the protecting epithelium, dullness in the corneal reflex, edema of marginal cells and lymph spaces, leukocyte build-up and a detectable prominence at the ulcer margin. And while this increased circulation stimulates metabolic action to the maximum, this entire process being nature's best defensive measure, a breakdown in the tissues all too often takes place with attendant sloughing and extension into proximal tissue.

Corneal ulcers when centrally located are always a serious threat not alone to central vision but to the entire eye. While early increased metabolic action and more abundant pepipheral nerve supply in marginal ulcers render

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them not alone less difficult to control, any resulting corneal scars may bring about less impairment of the vision.

Superficial ulcers, involving Descemet's membrane lightly or not at all, will probably leave a scar of little or no permanent harm. Once the invasion has involved the substantia propria, a fixed opacity results, the density and extent of which depends upon the depth of penetration and the area involved.

The early appearance of any corneal ulcer resulting solely from bacterial invasion, does not distinguish it as of any particular type. Should an abrasion or trauma have preceded the bacterial invasion, evidences of the same would probably be observable, but even in that event, a break in the protecting epithelium with a corneal dullness, is plainly observable as evidence of bacterial presence.

Ultraviolet Therapy

It is believed by many observers that every corneal ulcer is proof positive of bacterial invasion. Nugent[1] clearly sets forth the process of tissue invasion and cell destruction resulting in corneal breakdown. To check the advance of this invasion and tissue destruction I have found no other therapeutic measure equally as effective as ultraviolet irradiation. And this is equally true whether the ulcer be central or marginal and with little distinction as to the type of bacteria responsible for the tissue devitalization.

A corneal abrasion, if immediately seen, may be rendered sterile by ultraviolet irradiation. At the earliest detection of any superficial corneal dullness not definitely attributable to palpebral-conjunctival irritation, irradiation may be justified as a precautionary measure.

The Council on Physical Therapy does not accept as conclusively proved that ultraviolet irradiation, in vivo, is definitely germicidal. The Secretary of the Council[2] reports "Nor are there critical data to support the claims made for the bactericidal action of ultraviolet radiation, in vivo, although evidence shows that cultures of bacteria may be made sterile by ultraviolet irradiation in petri dishes."

While we, of course, accept this dictum as to finality of proof of bactericidal destruction by ultraviolet irradiation in vivo, the observation of clinicians who report positive sterilization of infected areas are positively convincing.

Duke-Elder[3] outlines the destructive action from more intense irradiation of the involved area and the irritation to the tissue cells from the lighter intensities. As to the bactericidal action of irradiation he states:

> Pathogenic micro-organisms in the most superficial layers of this tissue are directly killed. Where there is much inflammatory reaction and infiltration present in the superficial corneal layers, however, the greater part of the abiotically active rays is necessarily absorbed. But in proportion as some degree of transparency remains, bactericidal action will be greater and extend more deeply. Superficial cells of the diseased corneal epithelium are killed and cast off with any contained bacteria.

It is in the accomplishment of exactly this result that ultraviolet irradiation has proved especially effective in corneal ulcers.

Nugent's[1] findings are in exact accord with those of Elder. He reports, "It has often been observed that within forty-eight hours after the first treatment of simple ulcers the entire surface is completely covered with new epithelial cells which at first are greyish and opaque but soon become clear and transparent." He further concludes: "Sterilization of the necrotic and perinecrotic area is most efficiently accomplished . . . and regeneration of new epithelial cells to cover the area is quite rapid."

It is important to appreciate that coordinate with and subsequent to the

destruction and sloughing of the infected cell structure, as above referred to, there is a very marked activation of the circumcorneal blood supply; that an inflammatory reaction is established and edema supervenes, flooding the entire involved area with increased bactericidal effectiveness.

All this permits of a stimulated rebuilding of the corneal structure and replacement with cell and epithelial tissue, as little encumbered by scar elements as nature can supply.

In our treatment of corneal ulcers we have employed the Hanovia water-cooled quartz lamp. With this lamp, forty-five seconds produces a mild erythema dose as shown on my own person. As stated by many writers the time element is vital and the erythema dose from the lamp employed, should be known. We have applied all irradiations through a quartz rod, the tip of which, is held at approximately ten mm. from the ulcerating surface.

Since this lamp delivers a range of wavelengths some of which are more deeply penetrating, the instrument is held in such position that no rays may fall upon or near the macula.

The dosage we have generally found most effective is a first application of thirty seconds, followed by twenty seconds or fifteen seconds on succeeding or alternate days, as advisable. The number of treatments probably averages three to five. At times, though not always, we outline the involved area with fluorescein.

Of the cases treated since ultraviolet therapy in my practice became a favored procedure, definitely depended upon in the treatment of corneal ulcers, we have suffered two disappointments. The cause of these failures I do not know. One was a very active bacterial infection in a man otherwise physically healthy, who was brought to the office by another oculist because treatment, usually effective in his hands, had proved disappointing. No observable improvement resulted from ultraviolet irradiation. It is possible that the duration of one or two of the treatments was excessive by a few seconds. The other case treated early in my experience with irradiation of ulcers, received but three applications when a change in treatment was followed by fairly prompt improvement. I am since convinced that the insufficient light treatments were of benefit and would have proven effective had they been continued. Aside from the above, I have had no disappointments in ultraviolet irradiation in corneal ulcers.

Case Reports

The following three cases have been selected at random for illustration:

M. J., female, 14. Brought by a specialist, Dr. R. was treated twice by Dr. S., an oculist not equipped with ultraviolet, but who suggested its use. An extensive central serpigenous ulcer covered, as nearly as could be estimated, one-third of the corneal surface. It very definitely involved Decemet's membrane in its lower third, but had not penetrated deeply in its advance upward. The superior palpebral conjunctiva was very rough and received ultraviolet irradiation for twenty seconds.

Thirty seconds of irradiation was administered to the ulcerated corneal surface, silvol drops and mydriatic continued with hot applications. Twenty second irradiations were given on the two succeeding days, then fifteen seconds for two days. Recession of the margins with less clouded appearance was observed after the first day except that at the fifth treatment, an extension downward was observable. Heavy irradiation of forty seconds was administered, after which five, twelve second treatments were administered over a period of three weeks. Recovery was complete except that tracings of faint leucoma remained.

The vision with correction when last seen was 6/8.

C. P., aged about 55. W. P. A. laborer, whose right eye was hit by a stone April 12, 1937. He did not seek attention until 8 p. m. of the 23rd, when he was given first care by Dr. R., an oculist, who reported "marked injection, heavy ulcer covering entire pupillary area, marked hypopyon anterior chamber. Eye sterilized, atropinized and dressed." The next day the patient reported that the eye was comfortable, and treatment with hot

applications was continued. He did not report again to Dr. R. for four days when he was referred to my office and after treatment was immediately sent to the hospital.

The records show "central corneal ulcer involving Descemet's membrane with question as to perforation at lower margin; hypopyon practically obscuring pupil, visible portion of iris appears inflamed with possible anterior synechia. Ulcer about four by four mm."

Treatment: Ultraviolet irradiations thirty seconds first day, then twenty seconds daily for four days, with treatments on the seventh and ninth days. Midriatic with local mercresin drops and hot applications. In five days left hospital, with cornea free from inflammation but heavily scarred over central ulcered area.

Student, male, 18. A very active central serpigenous ulcer, of two days standing, causing more than usual pain and involving one-fourth of the lower central corneal surface. Treatment by local physician had no noticeable effect. Thirty seconds irradiation with local boric wash and local heat. After twenty-four hours no further advance and less irritation. Irradiated twenty seconds. After forty-eight hours less corneal clouding, ulcer margins receding, less circumcorneal injection, little irritation. Irradiation fifteen seconds. At end of another forty-eight hours little evidence of ulcer remained with no discomfort. No further treatment. Vision after six days was normal.

I regard these three cases as evidencing typical effect of irradiation in corneal ulcers.

Conclusions

The final pronouncement as to the bactericidal effectiveness, in vivo, of ultraviolet irradiation has not been made.

Oculists with wide experience report effective bactericidal results in corneal ulcers with reduced scarring.

Ultraviolet irradiation may be safely employed at measured dosage. Irradiation is of service in every stage of corneal ulceration.

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TREATMENT OF ARTHRITIS WITH ACETYL-BETA-METHYLCHOLINE CHLORIDE

DOUGLAS BOYD, M.D.
STAFFORD L. OSBORNE, B.P.E.
and
DAVID E. MARKSON, M.D., F.A.C.P.
CHICAGO

The choline compounds have been the subject of considerable pharmacologic interest, but until acetyl-beta-methylcholine chloride became available, were not suitable for therapeutic use. This is a drug of prompt and vigorous actions, analogous to those which follow parasympathetic stimulation of the nerves, and is accompanied by peripheral vasodilatation. It is with this latter action that the present discussion is concerned. Our study attempts to ascertain the effect of acetyl-beta-methylcholine chloride on the peripheral circulation and through this action on the clinical course of a group of patients with arthritis. While we are not convinced there is a causal relationship between circulatory changes and chronic arthritis, we do know that circulatory disturbances accompany and aggravate the disease. In this fact lies the widely accepted value of the various forms of actinotherapy.

It is difficult to evaluate any therapy of arthritis, without careful consideration of the remissions so frequently seen in this group of patients. There exists no commonly accepted standard of measurement for successful treatment. One must adopt a long range point of view and wait for many months or years before drawing definite conclusions. We feel the realistic dictum of Dawson is all too true: that fifty per cent of arthritic patients improve on proper medical management, twenty-five when certain special measures are used, and the remainder do not benefit from any treatment. Nevertheless we should be grateful for improvement for a reasonable period, realizing that even as the patient with diabetes has to continue his insulin and the sufferer from heart disease his digitalis, so will the individual with arthritis have to continue his medical and physical therapeutic defense indefinitely.

It has been our desire to obtain objective measurements of observed changes after use of this drug and to control these measurements under as nearly uniform conditions as possible. While we did not have a constant temperature room, our results closely parallel those recently reported in similar study in which careful room temperature control was maintained.

Acetyl-beta-methylcholine chloride may be given orally, subcutaneously or by ionization. Our patients were all treated by the last named method. Its physiologic action is prompt and vigorous when given subcutaneously or by ionization. The criticism that a drug given in this manner cannot be measured is perhaps just, but one which might equally be raised against all forms of cutaneous medication. We are not willing to abandon ointments, nor to stop medication by mouth, where certainly one is never certain of the degree of absorption. We therefore believe the method to be effective, because after administering acetyl-beta-methylcholine chloride by ionization, we obtain such characteristic general actions as: (1) fall in blood pressure; (2) rise in pulse rate; (3) flushing of the skin of the face and neck;

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(4) sweating, and (5) increased salivary flow. These general effects in our patients appeared ten or fifteen minutes after the application of a direct current. It is important to remember that atropine promptly abolishes the action of this drug because occasionally undesirable effects are seen. Atropine has a constricting action on the bronchioles, and transient asthmatic attacks have occurred in those susceptible to iontophoresis. We have had to use atropine only once, in a rheumatic cardiac patient, who had syncope during treatment.

We particularly desired to give acetyl-beta-methylcholine chloride by ionization, because this gave a slower absorption, and a local vasodilatation at the area selected for treatment. We had no difficulty in obtaining the general effect of the drug, and in addition saw a striking local reaction of increased skin temperature, sweating, "gooseflesh," accelerated capillary flow, and a diffuse erythema of the skin covered by the positive electrode. This reaction, we are convinced, is quite different and more lasting than that of counterirritation and from our controls seems to be definitely a local drug effect. With such marked local effects, it seemed advantageous to us to use this drug in this manner in arthritic patients.

In our experience it has consistently produced the striking characteristic reaction. We observed a fall in the blood pressure averaging 12 millimeters of mercury and a rise in the pulse rate averaging 22 beats per minute. The respiratory rate was unchanged, but most patients had a sense of heaviness on the chest and inspired deeper. The flushed face, neck and ears occurred, as well as marked sweat, even in some individuals who had not perspired for several years. This was marked about the flushed areas. Salivation and occasionally lacrimation lasted one to two hours. The body temperature taken per rectum and checked by thermocouple, showed no change. The skin temperature over treated areas showed a consistent rise of 2-4 F.

The reactions noted are specific ones due to drug action and not to electric or heat effect. We have used the same technic in the same patient without acetyl-beta-methylcholine and none of the characteristic effects of the drug were observed. Other controls were made by local use of diathermy, infra-red, and by reversing the current with the drug under the negative electrode. In none of these did we produce any general reaction, and the local effect of these heating agents was obviously less in degree and of a more transient nature.

Technic

"We used a vacuum tube rectified direct current which gave a fairly smooth galvanic current; the active electrode consisted of an asbestos fabric (resistant to tears) saturated with a 1 per cent solution of acetyl-beta-methylcholine chloride. Lower concentrations of the drug were tried, but we did not obtain satisfactory reactions with less than a 1 per cent solution. Kotkis and his associates, working with dogs, reported no difference in drug effect with 1-1000, to 1-8000 solutions. They did, however, cover a relatively larger percentage of the skin area but did not mention the effect of stronger (1-100) solutions. We found a decided difference between the reactions obtained with a 1-100 and a 1-200 solution. The weaker solution gave none of the clear-cut general reactions.

The saturated fabric was wrapped in close contact about the part to be treated, and then a metal foil strip, three-eights of an inch in width, was wound spirally about the saturated paper. This metal strip was used to conduct the galvanic current evenly over the whole area. The positive pole of the galvanic current source was connected to the distal end of the metal strip. The negative pole of the apparatus was connected to the patient's back

by means of a large dispersive electrode, 10 by 12 inches in diameter. This completed the circuit. The strength of current and the time of the current flow regulates the effectiveness of the ionization. We fully realize the limitations of introducing ions into living tissues by this method. Individual tolerance to the treatment guided us somewhat in the current strength, but we were usually able to give 40 to 50 milliamperes for twenty minutes after the first treatment. When the treatment was started, the current strength was gradually raised until the desired milliamperage was reached. Sudden increases should be avoided. At the end of each seance the current intensity was gradually reduced until no current flowed. After the treatment the patient should remain quiet and warm for thirty to sixty minutes and then be allowed to resume his usual activities. When many joints are involved we have found it better to concentrate treatment on one joint or a limited area, such as the hand. The most satisfactory interval between treatments appeared to be three or four days. The therapeutic effects on patients were studied after five, ten, fifteen, twenty and twenty-five treatments. As a result of this observation, we found the maximum effect was achieved after eighteen to twenty treatments."

Clinical Observations

We have treated thirty-five patients in the manner described. Earlier no attempt was made to select patients by the type or stage of their arthritis. It became evident, as one could expect, that the less advanced ones received the most benefit. This was true in both the rheumatoid and osteoarthritic patients. Those with numbness, paresthesia and evident circulatory disturbances in their extremities — the cool, pale, moist and often cyanotic hands and feet — gained most from this treatment. Acetyl-beta-methylcholine chloride does not appear to be useful in patients with rigid arteries nor is it feasible to treat patients with well distributed skin disease. In our experience it has proved most helpful in those who: (1) show the earlier changes of the rheumatoid type with cool, damp and cyanosed extremities; (2) have moderate or early hypertrophic changes with paresthesias and sensitivity to cold, and (3) have sciatica or manifestations of neuritis from root irritation by spinal arthritis.

We attempted to gain a definite measure of the blood flow changes in the digital extremity of the limb under treatment, by measuring the pulse volume wave in the finger and the toe. These changes were graphically recorded by the Johnson plethysmograph. These graphic records, taken on the fingers before and after treatment, show an increased wave deflection, which is apparently due to an increased dilatation of the blood vessels and thus an increased minute flow in the part.

Confirmation of these findings recently appeared in a report by Montgomery and co-workers. They studied the blood flow in the hand before and after acetyl-beta-methylcholine chloride by ionization, in a constant temperature atmosphere. Their opinion was that their results confirmed the belief that ionization with acetyl-beta-methylcholine chloride produced a marked dilation of the blood vessels in the treated part and further that the changes observed were too great to be solely in the peripheral vessels. They felt the action was probably exerted on the deeper vessels as well. Some arthritic patients showed a rather flat wave before ionization. This often increased threefold after treatment.

We did not have a constant temperature room, but tried to keep uniform conditions in the room and the patients free of drafts. The work of Montgomery, cited above, controlled this factor and demonstrated similar changes. We are convinced that this pulse volume wave record, or the min-

ute volume flow is a more accurate index of improved circulation than observations of capillary changes in the nail fold. We do not believe a convincingly characteristic capillary bed picture has been presented in arthritis.

The improvement and remission cycle of arthritis and the lack of any well defined measurable factors render evaluation of the therapy problematic. We cannot present here a universal treatment for arthritis, nor can we report a very high percentage improvement. One learns to judge fairly well his own patients and their degree of clinical improvement. Decreased pain, increased motion and function rest largely on the patient's interpretation of his subjective sensations.

The hands treated in ten of sixteen patients showed an increased flexibility in function and usefulness in work. A patient, for example, who previously had been able to lift her coffee cup to her mouth only by using both hands, was able to do this with one hand in a normal manner. Another, forced to give up her work as a clerk and unable to do sewing, became able to work and sew again four days a week for an hour or longer without discomfort. A young woman with considerable pain, stiffness and weakness in her hands who had been unable to do her housework for two years, reported a decided decrease in joint pain, improved motion, and a marked increase in strength. She was enabled to do all her housework except scrubbing floors and ironing. An older woman with lumbar and sacro-iliac arthritis, who complained of aching pains and constant fatigue to such an extent that she was comfortable only in bed, was treated over the area of her discomfort with the usual general reaction. After treatment the low backache largely disappeared, she felt quite strong again and was not so tired. Four months later without further treatment she was much stronger and without undue fatigability. A medical student observed increased flexibility of the hands, lessening of considerable morning fatigue and joint stiffness, became much less tired and resumed walking and other outside activities. He noted the effect of the drug for three or four days after each treatment.

The group of failures were in general the elderly, far advanced rheumatoid arthritic patients with bone changes and fibrosis. In such advanced states much relief cannot be expected.

Striking relief of pain was afforded some patients, but as a record of therapeutic achievement our results are fairly satisfactory. The striking therapeutic effects were decreased fatigability and increased endurance. This was consistently noted in almost all patients who absorbed the drug and took a sufficient number of treatments. Several patients resumed their normal activities, spent less time in bed, and carried on more work and play without increase of pain, stiffness or fatigue. This improvement in the endurance of our patients was called to our attention voluntarily and spontaneously, it having been unanticipated. We have not noted such a relief under other forms of treatment. That this is an important factor in their lives is constantly borne out by the complaints of most patients. Most workers in this field agree that rest sufficient to relieve fatigue is a most important element in the treatment.

Acetyl-beta-methylcholine relieves fatigue in a large percentage of patients who are able to take adequate dosage. Whether this is due to its vasodilator effect or some more direct effect on the muscles, we do not know. No satisfactory measure of such fatigue has been proposed, though indirectly metabolic studies may help. It has not yet occurred to us how this factor can be measured. We believe that if fatigue can be controlled, in many instances pain can be relieved, physical activity increased, and the morale of these patients raised. It is this effect of mecholyl and the striking

improvement in the functioned comfort of joints, especially in hands affected by arthritis that this was most impressive.

Conclusions

1. Thirty-five cases of arthritis have been treated with acetyl-beta-methylcholine common ion transfer.
2. Ten of sixteen patients whose hands were treated showed an increased flexibility in function and usefulness.
3. Pain was reduced in some patients.
4. Muscular fatigue was markedly relieved in almost all cases adequately treated.
5. Increased endurance was experienced by those completing a full course of treatment.
6. Maximum effects were obtained after a course of eighteen to twenty treatments.
7. Circulatory changes were graphically demonstrated.
8. Patients with circulatory disturbances of the extremities; those with cool, pale, moist, and often cyanotic hands and feet gained most from the treatment.

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Discussion

Dr. B. S. Troedsson (New York): I believe that Dr. Boyd and his co-workers have done careful and well controlled work on iontophoresis in chronic arthritis. They are to be commended for their painstaking observations. The scientific value of the work would undoubtedly have been increased if in addition they had classified their rheumatoid cases according to the method of Hench and also added some data on the sedimentation rate and possibly the Schilling count. Unless we who are doing work in rheumatoid arthritis adopt certain yardsticks that enable us to measure our results in an almost mathematical fashion, we will not be able satisfactorily to compare our methods of treatment. According to the figures, there was improvement of one kind or another in fifty per cent of the cases. The report thus occupies the exact middle-ground of opposite statistics and probably gives us a true picture of the value of acetyl-beta-methylcholine iontophoresis. I have tried in a limited number of cases both histamine and acetyl-beta-methylcholine iontophoresis, and it seems to me that our conservative forms of physical therapy, as advocated by Cecil and Currence, are to be preferred. With the work that is at present carried out on the H-substance, it is possible that iontophoresis may occupy a much more prominent place in the future. At present, it still has to be considered as in the experimental stage.

COLON DISEASE AND ITS THERAPY IN RELATION TO CHRONIC ARTHRITIS *

ERNEST C. FISHBAUGH, M.D.

LOS ANGELES

The gastrointestinal tract has long been recognized as an etiologic factor in chronic arthritis. The removal of foci of infection in the mouth, gall bladder, appendix and rectum has often been attended by prompt relief of early joint infection. In some instances the separation of constricting bands and adhesions to the cecum or partial colectomy, has given such astonishing relief from chronic arthritis as to clearly demonstrate a direct relationship to the colon.

It is the purpose of this communication to consider patients, who have had all foci of infection in the sinuses, tonsils, teeth, cardio-respiratory tract, biliary tract, appendix, rectum, generative organs, and urinary tract excluded or removed, and in whom there were no abdominal bands or adhesions, syphilis, gout, or joint trauma. One hundred and forty private patients with chronic arthritis have been selected for this study, in whom all factors except the colon have been excluded. The intestinal flora, bacteriology, allergy, and metabolism will not be discussed.

Incidence

This group consisted of approximately 29 men and 111 women; 107 of whom were married and 35 single.

The ages varied from 15 to 90, with an average of 49.3 years (table 1).

TABLE 1. — *Distribution of Ages*

Cases (Number)	Age (Years)
3	Under 30
28	30 to 40
33	40 to 50
42	50 to 60
26	60 to 70
6	Over 70

It was noteworthy that the number of patients with chronic arthritis in this group increased with the age corresponding to the time in life when intestinal disturbances were most frequent (tables 2, 3).

TABLE 2. — *Duration of Arthritis Symptoms*

Cases (Number)	
49	1 or less
53	1 to 5
15	5 to 10
24	10 and over

TABLE 3. — *Intestinal Symptoms*

Cases (Number)	Symptoms
90	Chronic constipation
10	Diarrhea
40	No constipation
125	Bloating and indigestion
15	No symptoms

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In this group 78 patients complained of varying degrees of backache, vertigo, and coated tongue, 62 patients had no such symptoms. All patients complained of general weakness and exhaustion.

Eighty patients had observed an aggravation or flare-up of the joint symptoms when there was an increase in the intestinal disturbances, and relief when the intestinal condition was corrected. Many of them reported that constipation was certain to make the joint condition worse. Others had also observed that enemata, irrigation of the colon, or a thorough purge would give relief. It was also noted that starvation lessened the joint pain and swelling.

Thirteen patients were over-weight, 10 patients under-weight, and 117 normal. General physical examinations were negative except for the joints and the abdomen. The diseased joints varied greatly in location (table 4).

TABLE 4. — *Location of Affected Joints*

Cases (Number)	Location
37	Extremities
11	Back
92	Extremities and Back

The joint findings showed different degrees of periarticular and articular changes depending largely on the duration of the disease. In some patients the progression of the joint destruction and deformity was quite rapid. X-ray films revealed definite joint lesions in 107, while 33 patients had not had the disease long enough to be demonstrated roentgenographically.

Abdominal examination proved negative in 22 patients. There was marked tympany in 118, 50 of whom showed general or localized abdominal tenderness. The rectum was normal in all instances. Blood pressure studies revealed the following variations (table 5).

TABLE 5. — *Blood Pressure Findings*

Cases (Number)	Systolic Blood Pressure
56	120 or less
68	120 to 150
26	150 or more

The Wassermann test was negative in all patients. The blood uric acid was normal in all patients. The blood count was below normal in 69 patients and normal in 71. Kidney studies showed normal urine and function in all instances. The Rehfuss fraction test breakfast revealed 13 cases with achlorhydria, 67 patients with reduced, or normal acidity, and 60 patients with hyperchlorhydria. Stool studies were normal in 22 patients; 31 showed marked fermentation without mucous, and 87 fermentation, mucus, and pus. Nine patients revealed motile amoeba histolytica. The stool studies gave evidence of colon irritation in 118 patients. Bacteriologic stool studies are not reported in this communication. Hypothyroidism was present in 31 patients. The average basal metabolic rate deficiency was 18.3 per cent.

Roentgenographic examination proved of greatest value in the study of this group. The motor dye study of the gall gladder was normal in all instances. The stomach was empty within four hours in 134 and over four hours in 6 patients. The terminal ileum was empty within 6 hours in 30 and within 8 hours in the remainder of the group. The colon was not empty in 48 hours in 67 in whom longer observation was impossible, while 73 required more than 72 hours to empty the colon. It was interesting to note

that there was stasis in the cecum alone in 61 patients, while 79 showed sluggish emptying, not only in the cecum but the entire colon.

X-ray examination of the colon in the 40 patients who had no constipation revealed that 14 did not empty in 48 hours; 20 did not empty in 72 hours and 6 were not empty in 96 hours. This delayed type of constipation could only be determined by a careful motor x-ray study of the colon.

Diverticulosis was found in 23 patients, and the location of the diverticulae was as follows (table 6):

TABLE 6. — *Site of Diverticula*

Cases (Number)	Location:
3	Ascending Colon
10	Transverse Colon
16	Descending Colon
20	Sigmoid
5	Rectum

The presence of diverticula of the colon may frequently be overlooked unless a thorough motor study of the colon is carried out. The diverticula may not be observed unless the main mass of the barium has been evacuated. The diverticula usually do not empty as rapidly as the main portion of the colon and may remain filled for days or even weeks after the colon itself is relatively empty.

The determination of disturbance of the colon as the etiologic factor in chronic arthritis in this group is based upon the following diagnostic data:

1. History suggesting a relationship between the colon and the chronic arthritis.
2. Careful elimination of all other possible etiologic factors.
3. Finding of colon abnormalities, such as chronic constipation, delayed bowel movement type of constipation, chronic or subacute colitis, amebiasis, or diverticulosis.
4. Relief of symptom by therapy directed toward the correction of colon dysfunction and disease.

General Treatment

Treatment of chronic arthritis of the colon type is protracted. Removal of foci of infection, such as teeth and tonsils, are often followed by prompt relief in early cases of arthritis where no great joint disturbance has occurred. Results in arthritis due to colon infection are less prompt, its management requiring prolonged care. Patients should understand that they must have great patience and continue the treatment for weeks, months, or even years if necessary, to avoid permanent joint deformity. They should be advised that neglect of colon hygiene will result in recurrence of the arthritis. The colon cannot be removed — it must be kept well. After careful and repeated warnings, most patients will cooperate.

The general physical condition should be built up and the blood count kept normal, if need be by repeated blood transfusions. The patients should have adequate rest, sunshine, and fresh air, if they are to overcome the chronic, debilitating joint disease.

The treatment is classified as follows:

1. *Diet.* — Food allergy will not be considered in this discussion. From a review of this group of patients it would appear that no food or group of foods was in any way a contributing factor to the arthritis. Correct elimination seemed to be of greater importance than the character of the food ingested. Bulky foods appeared to be stimulating to the atonic, non-inflamed

colon. Smooth diet was preferable for patients with chronic or subacute colitis, and those with diverticulosis.

2. *Medical Aids.* — Bulk was supplied in the form of saraka, saraka B, agar agar, psyl-o-gar, or some other non-irritating substance easily ingested. Paraffine oil was especially helpful in the patients with diverticulosis. Oil seemed to keep the stool soft in the diverticula so that they emptied freely and became less irritated. Colon spasm was controlled by belladonna preparations, atrophine, and sedative-like medicaments such as bellergal or belladenal. Mild stimulating laxatives were used as sparingly as possible. Medication and dietary directions were regulated so as to produce two or three soft-formed stools daily.

3. *Mechanical Aids.* — Heat, in the form of hot fomentations, diathermy, or high frequency, affords much relief from the colon spasm and general abdominal tenderness. This should be continued as long as these abdominal symptoms persist. Enemata are useful in relieving the stagnation in the rectum and sigmoid, but rarely empty the entire colon. Colon irrigations carefully and thoroughly administered are preferable, because they do not distend the colon nor do they cause the discomfort of enemata. The tube is passed slowly to the cecum as the colon is emptied, thereby leaving it free of all fecal material. Colon irrigations by means of the cecal tube have repeatedly given excellent results when all other methods have failed, including enemata. Normal salt solution is used for these irrigations. Normal saline solution is non-irritating, and since the fecal contents is washed from the colon, purgative solutions are not necessary. The use of intestinal antiseptics seemed to have had no advantages. The frequency of the irrigations varied, depending upon the degree of toxemia and the duration of the arthritis. In severe cases the colon irrigations were given daily for one or two weeks, then on alternate days for a few weeks, and gradually decreased until all symptoms subsided. The number of colon irrigations given this group of patients has varied greatly. One patient received as many as 408, the average number was 43.

It is most important that colon hygiene be continued indefinitely. The slightest recurrence of the intestinal symptoms calls for immediate treatment if a recrudescence of the arthritis is to be avoided.

The affected joints should receive the same nursing care as arthritis from any other cause. The management of the joints themselves will not be discussed further in this paper. There seems little doubt but that chronically infected joints themselves become foci of infection. Doubtless, the slow improvement noted in some instances is due to the fact that joint foci spread the disease to other joints.

Results

The results of treatment of chronic arthritis due to colon disease are probably less satisfactory than those of arthritis due to removable foci of infection. The colon is ever present and unless kept in a normal condition the joint symptoms may recur. Frequently it was observed that quiescent joints became very active following an attack of constipation, colitis, or diverticulitis. Since the cause of the arthritis cannot be completely and permanently removed, it would seem that results should be classified as quiescent, improved, and not improved (table 7).

It is obvious from this chart that the better results followed prolonged periods of treatment and observation. Undoubtedly, many of the "improved" or "unimproved" cases would have become "quiescent" had it been possible to continue treatments over a sufficient length of time. It is a chronic debilitating disease and requires long treatment.

TABLE 7. — *Therapeutic Results*

Classification	Cases (Number)	Observation & Treatment (Months)
Quiescent	93	36.0
Improved	33	3.5
Unimproved	14	1.9

Summary

1. Disturbance of the colon is a frequent cause of chronic arthritis.
2. The diagnosis is outlined and its importance emphasized.
3. The treatment and results are discussed.

Discussion

Dr. E. Goldfain (Oklahoma City): There is no question, I feel, in the mind of any internist who treats rheumatic disease that the colon must always be kept in mind as one of the factors in the causation of chronic arthritis of the undifferentiated type. It happens that Dr. Fishbaugh does not designate which type of arthritis he is referring to, or whether he means both the hypertrophic or atrophic types. The fact that all patients complained of general weakness and exhaustion, leads me to the assumption that Dr. Fishbaugh is concerning himself more than likely with the atrophic rather than the hypertrophic type of arthritis. Atrophic arthritis cases are subject to general weakness and exhaustion almost universally, while the hypertrophic type of arthritis is more often seen in robust individuals.

It is quite common for symptoms to be more noticeable when drainage of the colon is not good. Conversely then, any therapy which is broad enough in its scope to treat the individual as a whole as well as focusing one's attention on the colon, is the better method of treatment. It is important to re-emphasize that the first half of the colon is almost all-important when one considers treatment of this organ. It is from this part, especially the cecum and ascending segment, that absorption of toxic and infectious materials tends to be greatest and puts a severe load upon the portal system. That being the case, it is not at all unusual that Dr. Fishbaugh found the rectum to be normal in all cases. However, we must keep in mind that chronic ulcerative colitis in a fairly definite percentage is complicated by rheumatic or arthritic involvement. In such case the rectum is often involved in a rather marked degree. However, the pathologic process in such cases usually does extend above the rectum.

I am rather interested in his finding of motile amoeba histolytica in nine of his cases. Did Dr. Fishbaugh institute proper medicinal treatment for such infection and was that all that was necessary in these particular cases to cause a recession of the symptoms?

In my experience the basal metabolic rate does not run low to the degree noted by the author. In general the basal metabolic rate in my cases will be above minus 12, with some exceptions.

I feel that x-ray examination of the gastrointestinal tract is of paramount importance. It is by following the barium meal through the entire tract that we gather information as to the efficiency of the intestinal musculature, the presence of diverticula and latent constipation. By that is meant individuals who have regular daily bowel movements, yet when a barium meal is followed through the bowel it will not be eliminated from the colon before seventy-two hours. I have seen an instance in which the barium meal was not entirely eliminated until eight days after ingestion by mouth and yet the patient had regular daily bowel movements. It is necessary in such cases to assume that even though there is daily bowel elimination there is very definite stasis. Such stasis, of course, predisposes to greater bacterial activity with a larger amount of toxic and infectious products being absorbed into the system, thereby producing that state usually designated as intestinal autotoxemia. Dr. Wiltsie in his book "Chronic Intestinal Toxemia," very capably discusses this type of colon disturbance. Dr. Pemberton also stresses the need for careful attention and management of the gastrointestinal tract as part of a well-rounded plan of management for a case of chronic arthritis. He shows in this book that a close relationship exists quite often between the joints and the gastrointestinal tract by his experiment in which it is shown that the amount of sugar in the joint fluids increases promptly and very definitely as soon as carbohydrates are taken by mouth, and often even before it causes a rise in the blood sugar content. This would indicate that the products absorbed from the colon into the system which the liver is unable properly to detoxify, they are quite likely to produce direct or indirect damage to the sensitized joint tissues.

I am very glad that Dr. Fishbaugh emphasizes the need of treating the patient as a whole and not just the colon alone when he recommends that the blood count should be kept normal, that rest, sunshine, fresh air, and general health must also be kept up to par if results are to be obtained in the management of these patients.

The matter of colon irrigation is still debatable. Some men use this method to obtain better drainage of the proximal colon, while others rely upon the more conservative or at least older and better known measures. Personally I feel that colon irrigation is an excellent method of treatment when it is applied not indiscriminately but specifically. In other words, the treatment of a case by colon irrigation should be instituted only when there are certain definite indications. Again, I feel that Dr. Wiltsie's book brings these indications out in an excellent manner and I recommend it to the attention of those who are interested in this method of treating disturbances of the colon.

Dr. James W. Wiltsie (Binghamton, N. Y.): Dr. Fishbaugh's paper was exceedingly interesting to me since in many ways it duplicates my own experience both with arthritic cases and with others whose ill health was predominently of colonic origin. Dr. Fishbaugh makes the statement that treatment of chronic arthritis of the colon type is protracted, also that the results of chronic arthritis are probably less satisfactory than those of arthritis due to removable foci of infection. Dr. Goldfain in his paper this morning also remarked that arthritics require a longer period for bacterial change than any other group of patients. This also is true in my experience. The offending organism is usually a streptococcus and streptococci are not influenced by foreign implants as a rule, nor by so-called intestinal antiseptics, laxatives or diet.

Streptococci in the colon are almost invariably secondary to infection elsewhere in the body and their persistent presence there over long periods of time indicates a continuance of infection elsewhere, with excretion of bacteria from the blood stream into the colon or by way of the biliary tract. Vicious circles are almost always present with the colon a common factor in all. It may be impossible to recover streptococci from the stool as they usually lie close to the mucous membrane of the colon. Their presence may best be determined by swab culture from the mucosa of the sigmoid through the sigmoidoscope.

Over a period of time certain tissues of the body become increasingly sensitive to the end-products of bacterial life and death, and develop an altered reactivity to these products and those resulting from their union with antibody, which reactivity is commonly spoken of as bacterial allergy. Such highly sensitized tissues have been called the shock tissue, which becomes the tissue in which the characteristic pathology of the disease entity is found. However, all the tissues of the body show this increase in sensitiveness to the end-products of antigen-antibody union to some extent as is indicated by the phenomenon of retardation.

In arthritis focal infection is generally considered from the non-specific point of view since different strains of any given organism appear to be able to create identical pathologic lesions. It would appear that such factors as the establishment of vicious circles, allergy, and inadequate drainage, both cellular and gross, were the determining factors governing the specific manifestation in which chronic focal infection expresses itself, rather than the nature of the infecting organism and the resistance of the host. In other words tissue reactivity and factors influencing the natural drainage systems are more important etiologic factors in focal infection than the degree of specific immunity attained. In its relation to arthritis the nature of the infecting organism is important only as it affects the preparation of, or selection of, a vaccine for the purpose of desensitizing the tissues to bacterial allergy.

Early removal of recognizable foci of infection may and often does result in early cure of arthritis. However, when the colon becomes involved arrest of the disease assumes a more complicated aspect. The complete eradication of infection now becomes a matter of years rather than months. Not only must all known foci be removed or drained, but these internal vicious circles must be broken and kept broken until every circle has been completely drained of infection. Since the colon is common to at least three circles it would seem to be the logical point of attack. It should, therefore, be kept as free from the presence of the pathogenic organism as possible, *continuously*, for many months. Inasmuch as allergic retardation, invariably present in arthritic conditions, is a factor definitely interfering with free drainage, this process is slowed down in speed to a fraction of that common to the ordinary case of intestinal toxemia.

The use of colon irrigations as described by Dr. Fishbaugh is undoubtedly the most logical and most successful approach to the cure of arthritis in cases in which the colon is definitely implicated yet known. It must be stressed, however, that a correct selection of cases, properly given irrigations, and subsequent management of these cases calls for prolonged study and experience, and must be considered a specialty in itself, not to be taken lightly even by well qualified physicians. The patients cannot be turned over unreservedly to nurses or even trained technicians in the employ of the physician. The physician himself must evaluate each case daily since many predisposing and influencing causes frequently appear unexpectedly and might be missed by a technician.

RATIONAL COLON THERAPY

WM. W. WORSTER, A.M., M.D.

SAN GABRIEL, CALIFORNIA

With the introduction of any new therapeutic agent there arise those who make extravagant claims for it and others who decry it as worthless. Colon therapy has been no exception. It has had advocates whose claims are simply ridiculous while others have denied it any virtue. Those who have used it without prejudice have found it to be a valuable therapeutic agent.

When using colon therapy, our first thought naturally is relief of constipation, and excellent results are obtained when a proper technic is used. But far too many limit the value of colon therapy to this local action and ignore its value in relieving many disorders having no apparent connection with the colon.

The only way the colon can produce pathologic conditions beyond its own structures is by the action of toxic and infective substances which are absorbed from it by the blood stream. When these conditions are found, the first thought should be to prevent absorption by thoroughly cleansing the colon, which requires a different technic than the one used for constipation. The objective is not to tone the bowel but to cleanse it.

Before going further into the value of colon therapy let us take a look into the colon itself. Here we find the residue of digestion. Bacterial examination demonstrates the presence of pathogenic bacteria. Chemical examination reveals many end-products of putrefaction which, in most instances, are poisonous. Absorption of either the bacteria or the putrefactive products, unless destroyed by the liver or some other organ, may cause serious trouble.

Let us discuss a few conditions which might result. Infective arthritis has long been attributed to focal infection. As a consequence the teeth, tonsils and all possible sources of infection have been removed. But the colon has to a great extent, been ignored as a source of focal infection. It would seem quite impossible for a person to continuously have pus in the teeth and tonsils without, sooner or later, some of it reaching the colon and thereby setting up an additional focus of infection. When searching for focal infection why stop short of the bowel? In fact, why not start with the bowel if perchance it is the cause, thousands of teeth might be saved. Therefore, why not use colon therapy as a routine measure in the treatment of infective arthritis unless the source of infection is definitely known to be elsewhere?

Asthma is another stubborn disease the cause, of which, in many cases, has remained obscure even after making a thorough research. Is it not possible that in the process of putrefaction some of the by-products might be a foreign protein which could be the cause of asthma? If so, why not remove them from the bowel before absorption has taken place?

Toxic goiter is another disease that has taxed the research worker. What causes this enlarged and over-active thyroid gland? It is a well-known fact that the thyroid is second only to the liver as a detoxicator. Because of this, could not the thyroid enlarge and become over-active to meet a toxic condition that the liver has failed to correct? In fact McCarrison,* an English surgeon, has been able to produce an experimental goiter by injecting the water extract from the stool of a toxic goiter patient into a goat. It would

* McCarrison, Robert: Life Line of the Thyroid Gland, London, Thacker, 1932.

seem proper therefore to add toxic goiter to the list of diseases in which colon therapy is valuable.

The suprarenal glands also have a detoxifying action. If they should become over-active, could not high blood pressure be the result, or if exhausted reduce blood pressure? In fact, could not the toxic substances themselves have either vaso-constrictor or a vaso-dilator effects? Stubborn cases of high or low blood pressure that fail to respond to conventional treatment, should be given colon therapy, at least experimentally.

When discouraged with a chronic skin disorder that is suggestive of some toxic origin the patient should be given the benefit of colon therapy.

Another valuable use of colon irrigation is in therapeutic fever. It is reasonable to conclude that the increased temperature would increase absorption. If this be true, should not all therapeutic fever treatments be preceded by a thorough cleansing of the colon? Perhaps much of the restlessness during the fever might thus be avoided.

Just a suggestion to the surgeon — if the prospective surgical case should be given a thorough colon cleansing daily for two or three days prior to operation, much of the postoperative gas could be avoided.

Objections have been raised against colon therapy on the ground that the mucous membrane of the colon has selective action and, as a consequence, toxic and infective material is not absorbed, otherwise everybody would be suffering from some toxic disorder. Let us take for granted that the normal mucous membrane of the colon does have a selective action, when the bowel is dilated and the membrane is stretched, it certainly cannot have selective action. Again, when the ileo-cecal valve is incompetent and the contents of the large bowel have free access to the small bowel, could not reverse peristaltic action carry infection into the small bowel and be absorbed?

Many attempts have been made to use colon therapy with unsatisfactory results and sometimes even ending in disaster. Before condemning the method the cause of the failure should be carefully investigated.

One of the greatest causes of failure is poor or inadequate apparatus. For the proper use of colon therapy it is necessary that the apparatus has facilities for both positive and negative pressure which can be accurately regulated and measured by a manometer. Such an instrument is as essential to colon therapy as a sphygmomanometer is to measuring the blood pressure.

Probably the greatest danger in colon therapy lies in the use of a long rubber tube. In many cases it might be used with apparent success but it is entirely too risky to use in cases of diverticulosis, adhesions and sharp angulations. For routine work a short metal applicator instead of a long tube is equally as effective and infinitely safer.

Poor results can be obtained with the best apparatus if the technic is incorrect. The idea that the entire colon must be thoroughly emptied and cleansed during the first treatment is fallacious. Hard matter, crusts, and the like, should only be softened during the treatment and expelled or washed out later. A series of treatments may be required to accomplish the desired results.

Failure to recognize the difference between intestinal putrefaction and constipation has caused many to condemn colon therapy. They are too often considered as synonymous. As a consequence, the deduction is made that if the patient is not constipated he does not need colon therapy. No greater error could be made in this field of therapy. It has been definitely proved that toxemia can exist independent of constipation and constipation can exist independent of toxemia.

In treating toxemias of intestinal origin it is very essential to thoroughly cleanse the bowel. The aim in the treatment of constipation is to

tone the bowel wall. Thus, it is obvious that two different technics are necessary — cleansing and corrective.

With the *cleansing technic* the water is permitted to enter the bowel slowly until the mercury column of the manometer indicates the desired internal pressure. The flow is then stopped and the water either passes the fecal matter or is absorbed by it. Such a condition is indicated by the drop in the mercury column. Unless considerable water enters the bowel, the process should be repeated several times and then the return valve must be opened to permit the bowel to empty. This procedure is to be repeated until the water returns clear. As a rule negative pressure is not used with the return flow until the bowel has been emptied as far as the splenic flexure.

Negative pressure assists in emptying the cecum, giving success where otherwise there would be failure. Between each washing the patient should have a short rest period. If the irrigation is properly administered, forty to fifty minutes are required with the use of four to twelve gallons of water.

In the *corrective technic* the water is permitted to enter the bowel and is held there for a short time, the same as for the cleansing technic. Then instead of opening the return valve more water is permitted to enter until the mercury column again indicates the desired pressure. The valve is then closed and held in this position until the mercury column slowly drops toward zero. This procedure is repeated until the mercury column fails to drop to the zero mark which usually indicates that the water has reached the cecum. As soon as satisfied that the water has reached the cecum one should administer alternately positive and negative pressure with a short rest between each change. This hydraulic massage will tone the bowel, soften the fecal matter and loosen particles that may have adhered to the bowel wall. The entire procedure should not last longer than twenty-five minutes after which the patient is permitted to go to the toilet and evacuate the bowel in a normal manner.

If, during the treatment, the mercury column starts to rise when all valves are shut, peristalsis has been excited. When this occurs the return valve should be opened immediately, permitting the bowel to empty as a result of its own contraction. In administering either of the technics no damage can be done to the bowel wall if the pressure does not rise higher than one-half pound or the suction more than two inches.

In selective cases, excellent results can be accomplished. Colon therapy should never be considered a panacea for all human ailments, neither should it be placed on the shelf as antiquated, but should be given its proper place in therapeutics.

205 South Mission Drive.

Discussion

Dr. J. W. Torbett (Marlin, Texas): Dr. Worster has given us a brief and splendid outline of the chronic cases, such as arthritis, nephritis with or without hypertension, goiter and various skin diseases, headaches and even chronic bronchial asthma and gall bladder and hepatic disorders that have been frequently relieved promptly by colonic lavage properly given with proper diet and hygienic measures.

I have had no experience with the apparatus using the mercurial manometer but know that we do get satisfactory results by using the rectal speculum, a short water tube inside and the return around it through a larger tube leading to the sewer with a glass observation window. An experienced operator can soon learn by gentle massage and external feeling over the colon and the patient's sensations how much water to use and how high to have the water supply.

In an article on this subject read before this Association two years ago in Kansas City, we reviewed 6,000 chronic cases treated at the Torbett Sanatorium and Clinic in which nearly half were constipated, about eighty per cent had urobilinogen, forty per cent indican in the urine and about twenty-six per cent of all chronic cases tested by the intradermal

(*Concluded on page 426*)

CLIMATOTHERAPY IN UPPER RESPIRATORY INFECTION *

C. H. GELLENTHIEN, M.D., F.A.C.P.

Medical Director — Valmora Sanatorium

VALMORA, NEW MEXICO

From time to time in the history of medicine, speculation and interest have been evidenced in the effects of environment and climate upon the patient. The many variable and insidious factors at play have rendered any thorough scientific appraisal impossible. Our impressions of climate and its effects upon the organism have been mostly empiric, but it should be borne in mind that empiricism is a recognized means toward scientific attainment. We have long recognized the winter peak of respiratory diseases[1] and the summer climax of gastro-intestinal disturbances. The prevalence of certain diseases in certain climates has long been known — malaria in the southern states, cholera and plague in the tropics.

We have noted that animals adapt themselves to the seasonal changes in their climatic environment. With winter coming on, hair and fur coats are thickened and the animal becomes fat. Even man in cold climates has a tendency to gain weight until the onset of winter and usually maintains this weight until spring, illustrating the stimulating effect of cold upon metabolism. Experimental work on mice[2] has proved that climatic conditions alone greatly influence growth. That climatic environment and diet have definite influence on the development of the human[3] is shown by the fact that Japanese, Italians and other foreigners who live in the northern part of the United States are larger, heavier and physically superior to those remaining in their own countries. Today, the sciences of meteorology and medicine are contributing much to our knowledge of climate. We speak of the weather as meaning the atmospheric conditions as shown by the meteorologic elements of a particular time; for a day, a season or even a year. The meteorologic elements are sunshine, temperature, barometric pressure, humidity, precipitation, evaporation, wind, clouds and electrical conditions of the air. Climate is the sum or the aggregate of these elements.

The climate of our Southwest may be defined as consisting of (1) high altitude, (2) intense and almost perpetual sunshine, (3) low humidity, (4) fresh air, (5) moderate temperature, (6) freedom from objectionable dust and odors, and (7) moderate motion of the air.

The first important factor in the climate of the Southwest is the altitude. At Valmora the altitude is 6200 feet; approximately one mile higher than Chicago and the Midwest. This altitude causes definite body changes which are largely attributable, directly or indirectly, to the lowered barometric pressures and the relative increase of available oxygen. The relative percentage volumes of oxygen in a cubic foot of air are: Valmora 20.8%; Chicago 20.95% (theoretical).

Actually, the percentage volume of oxygen in Chicago is only 18 or 19 per cent due to the smoke and other impurities. The average barometric pressure in inches of mercury is for Valmora 23.35″, and Chicago 29.30″.

The physiologic consequences of the adaptation to altitude, so far as is known, are all of considerable magnitude and surprisingly widespread. They include the following changes in the blood itself: (1) Increased number of red corpuscles, (2) Increased hemoglobin, and changes in the circulation,

* Read at the Seventeenth Annual Session of the American Congress of Physical Therapy, Chicago, September 15, 1938.

which results in (a) stagnant capillaries and reservoirs as the spleen being flushed out; (b) dilatation of lung arterioles producing an (c) increased blood flow through the lungs and possibly other organs with only slight changes in the respiration. The physiologic effect of lowered barometric pressure is a lessened tearing of scar tissue in the lung as the lung is blown out with each inspiration at high altitudes, due to the smaller tearing force of the lower barometric pressure.

Sunshine

Light therapy, both natural and artificial, has proved of definite value in tuberculosis and other infections of the upper respiratory tract.

The sun has ultraviolet rays, but none shorter than 2,900 Angstrom units ever reach us at low altitudes, as the shorter ones are filtered by the smoke and moisture in the atmosphere. The pure, rarified air of a mountain may contain twice the amount of ultraviolet rays as the atmosphere of a valley. The short rays do not penetrate as much as the longer ones, but are more bactericidal and are filtered out before the longer rays. Water and snow reflect these rays and increase their power considerably, for which reason people get "sunburned" so readily at the seaside or in a snowfield. It is not the warmth of the sun but the specific action of the violet rays which produces sunburn. The effect of the rays is augmented by the movement of the air, and lessened if given in a room where the air is still and warm.

Sunlight is the ideal radiant energy for wounds, since it embodies not only ultraviolet which hastens granulation, but also the long-wave light and heat rays which penetrate deeply and heal by producing hyperemia.

The mode of action of light has not yet been ascertained and empiric evidence still prevails.[4] Not even upon the single cell have the effects of light been completely clarified. Significant, however, are the laboratory experiments demonstrating effects upon the reticulo-endothelial system and upon capillary and cellular permeability with their resultant action upon immune processes and upon exchange of colloids and nutrition.

Clinically, however, sunlight represents one of the benefits of outdoor life making for physical and mental well-being. Experimentally in rickets, certain wavelengths of sunshine and artificial sources of light have been shown to be specific. In calcium deficiency diseases, such as rickets, infantile tetany and osteomalacia, ultraviolet energy has proved curative. However, to exaggerate the vital importance of light, either natural or artificial, and to make extravagant claims for it in therapy, and to employ it to the exclusion of hygienic and dietary regimes, is bound eventually to bring disillusion.

Topical applications and exposure of the entire body to carefully graded doses of natural sunlight or certain artificial sources of light rays definitely benefit tuberculosis of the larynx, mouth and upper respiratory tract. These beneficial results are due not only to ultraviolet rays, but the visible and infra-red rays as well as the conditions of the atmosphere.

In acute laryngeal tuberculosis, particularly with edema, local irradiation is contraindicated. Vocal silence, bodily rest and the electrocautery are much more effective. Oral and pharyngeal tuberculous ulcers, generally secondary, are most resistant to treatment. The actual sun is better than artificial light, for in addition to the ultraviolet, the other rays found in sunlight, combined with the fresh air, play a large part in the effect.

That in most parts of the United States there is not sufficient sunshine is shown by the records of the United States Weather Bureau. The records of the health departments in the large cities of the country show that in all of the winter months, little, if any, of the curative rays of the sun can penetrate the veil of smoke, fog and fumes that hang over them.

In the Southwest, the sun's rays are powerful, because of the altitude; there is approximately one mile less of atmosphere for the rays to penetrate and be absorbed. Next, the sun shines almost every day. During the past three years there were only two sunless days each year at Valmora; and finally, the temperature all the year round is comfortable so that it is a pleasure to remain out-of-doors.

With any form of tuberculosis light is to be used only as an adjuvant, and should be combined with all other indicated forms of therapy. The mainstays of treatment still are rest, proper dietary, and hygienic outdoor life.

The Environment

The human body is dependent upon the atmospheric environment and adapts itself to variations of temperature, humidity and other atmospheric changes by the respiratory system.[5] By weight, a man takes as much air into the body as he does food each day. Approximately 20 per cent of the body heat is dissipated through the nasal mucous membrane largely by radiation. The remainder is given up through the skin by evaporation, convection and radiation. The skin keeps the surface of the body warm and regulates the internal temperature.

The function of the nose as a respiratory organ is to heat, moisten and filter the air, and to act as a protector against the inspiration of bacteria. Dust particles in the air irritate and cause corrosion. A sudden change in the temperature of the air we breathe, fumes of noxious gases, and excessively dry atmosphere are destructive to the epithelial cells, and the bacterial flora present at all times gains a foothold in the denuded surface. But the most serious source of injury to the epithelial layer of the mucous membrane is dryness, due to low humidity of the atmosphere in artificially heated rooms. The effect is well illustrated in the epidemics of colds among school children when fall heating begins.[6] The upper respiratory tract cannot protect itself, except for a short time, against bacteria or irritating foreign matter in an atmosphere of low humidity. The membrane becomes too dry properly to function as a filter, thermostat or humidifier, and the bactericidal property is practically destroyed.

In order that the nose may function normally, the atmosphere indoors should have a humidity of 50 per cent saturation, and a uniform temperature of 68 to 70 F. Any marked variation from this humidity and temperature is an agent for respiratory infection.

Yates makes the following two conclusions:

First, that the severity of sinusitis, or sinus infection, depends upon the power of the mucous membrane to prevent its destruction by the inspired micro-organisms, and if the property that the mucosa possesses of preventing the passage of water and hence of water-soluble toxins is destroyed, there occurs a progressively increasing poisoning of the ciliated epithelium.

As the ciliary paralysis increases in amount, the secretion of mucous is also paralyzed until finally the micro-organisms come to dwell in a symbiotic state in the sinuses, and the toxins from them are readily absorbed with the production of remote symptoms.

Second, that the intimate relation of the tracts from the sinuses to the eustachian tube suggests that eustachian catarrh is a secondary manifestation of sinusitis, and that this same intimate relationship may be one cause of the enlargement of the tonsil.

Mention should be made of the variation in sensitivity of patients;[7] at one extreme we find in atrophic rhinitis the hypo-sensitive patient who will permit, without discomfort, the placing of applicators, tampons or eustachian catheters. At the other extreme there is the hypersensitive rhinitic who experiences great discomfort from the smallest amount of mechanical manipulation. Thus, we understand why one person may go in the ocean or through a dusty desert or through pollen laden air without much ill effect, while the hypersensitive patient develops a severe rhinitis by doing so. The winter rise in mortality from respiratory diseases corresponds to the fall in

temperature, and with the rise in temperature in the spring, there is a decline in the respiratory death rate. But the month of maximum mortality is not in the depth of winter but in February — the time of greater variation.

In the Great Lakes area infections occur in the late autumn and early winter, decrease through steady cold weather or midwinter, and again recur to a peak during the months of March and early April. During March and November, the combination of rain, muddy streets, freezing nights and thawing days, seems to be about the most potent factor predisposing to upper respiratory tract infections; a combination of humidity and marked changes in temperature between midnight and midday.

The following is a practical illustration of the effect of humidity on respiratory diseases. Montgomery,[7] who lives in Long Beach, California, a city of over 100,000 population, on the seacoast, where the humidity average during the winter months is approximately 90 per cent for the twenty-four hours, has conferred with pediatricians on the treatment of acute and chronic bronchitis and pneumonia (especially bronchopneumonia). These men practice what they call the "closed window treatment." This was found necessary because, while freezing is practically never known in this city, yet the combination of a temperature as low as 32 F. is quite common in winter, with a humidity, as stated, or close to 90 per cent. To open windows in the sick room and permit a sick child or adult to inhale into a diseased lung this kind of air has proved very detrimental.

Some patients have, therefore, been sent to the desert. Others who have remained at home are treated by this closed window method, i.e., the air is taken into the room and warmed to an appropriate temperature before being inhaled. In this manner, the humidity is lessened and the temperature raised, without changing the constituent gases.

Also, the treatment of sinusitis during cold, humid weather in this seacoast region resembles this closed window therapy. For instance, Montgomery has found it very difficult to obtain good results on oil workers who are on night shifts of eight hours, exposed to cold, humid ocean breezes. The same applies to officers and men in the Marine Service.

Consequently, instead of characterizing the sinus or chest patient as a neurotic or rainbow chaser, Montgomery believes that experimentation in the physicist's laboratory will reveal the reason why these patients become better oxygenated, develop better metabolism and have scantier secretions and freer drainage in certain climates. To this should be added the therapeutic value of sunshine and winds, and even if the value of climate does not amount to more than 10 per cent in serious borderline cases, this 10 per cent often means the difference between success and failure.

Winds and cold cause a decided increase in the basal metabolic rate. Mills claims that in many types of chronic affections the weather plays an active role, for regions of highly changeable temperature and pressure (stormy zones) usually have a population badly affected with chronic respiratory and arthritic troubles, sinusitis, chronic bronchitis and tuberculosis.

Changes of temperature of several degrees during the day are healthful and tend to produce a stimulating effect which accounts for a relatively low death rate.

Excessive atmospheric heat causes dehydration and loss of chlorides. The pH of the blood is increased and the CO_2 content is frequently lowered. Persons working in excessive heat and sweating often become faint and weak because of the loss of chlorides. Industry now dispenses tablets of sodium chloride to employees at regular intervals on hot days.

That overheating constitutes the chief ill effect of air upon health is clearly demonstrated by the work of the New York State Commission of Ventilation. Even slight overheating of rooms is harmful, producing irritation of the mucous membranes, sleeplessness, irritability, fast pulse, dryness of the skin, exacerbation of pre-existing lung diseases, a burden upon the heat regulating system of the body, a slight increase in the respiratory rate, a marked decrease in general vasomotor tone, and a considerable decrease in the volume and efficiency of work performed.

The internal temperature of a healthy man is usually constant, varying not more than 1 or 2 F. in the Tropics or the Arctic. Man adapts himself more readily to extremes in weather than any other animal. His skin and vasomotor system have more ability to regulate his heat, which is the end result of metabolism. The elimination of heat depends on the surrounding air for its evaporation of moisture. If the air is saturated with moisture and there is little or no wind stirring, the heat is not eliminated.

Effect of Temperature

During a heat wave a four-fold increase in the death rate over the expected death rate may occur, as when Chicago was reported to have a temperature of only 88 degrees about July 17, 1934, with humidity of 88 per cent, which resulted in many heat prostrations. At the same time, San Bernardino, Cal., and Phoenix, Ariz., frequently showed temperatures from ten to fifteen degrees higher with low humidity of about 30 per cent, and with few if any heat prostrations.

Mary Gover, Associate Statistician of the United States Public Health Service states in "Public Health Reports" (July 15) 1938:

> The heat may be certified as responsible for about one-quarter of the excess deaths, as in Kansas during July of 1934.[8] But during the heat wave there are also more than the expected number of deaths from heart disease, cerebral hemorrhage, kidney disease and pneumonia.
>
> If two heat waves strike a community during one summer, there will not be nearly so many excess deaths during the second one. This may be partly due to the fact that most of the deaths among persons with chronic diseases were hastened during the first spell. It may also be due to acclimatization.
>
> Sharp increases in mortality related to heat waves occur most frequently in July and in the states of Ohio, Indiana, Illinois, Missouri, Iowa, and Nebraska. North Atlantic cities are also frequently affected. A number of consecutive days of extreme heat have more effect on death rate than variable temperature.

Cold causes vascular changes in the mucous membranes of the upper respiratory tract as well as in those of the kidneys and splanchnic areas, producing an ischemia of the mucous membranes and so rendering them more vulnerable to penetration of bacteria.

Thus, low winter temperature with accompanying high humidity, predisposes to infections of the upper respiratory tract more easily than high summer temperature with low humidity.[9] When the body is exposed to air, either damp or dry, or a temperature and humidity that produces a loss of heat from the body faster than the heat mechanism is able to produce heat within the body, a chill results. The presence of infection may affect the heat production mechanism. Infected persons are more susceptible to variations of temperature due to subnormal metabolism and decreased body heat production. Older people require a higher temperature to live comfortably than children.

On account of differences in conduction of heat, moist cold air feels cooler and moist warm air hotter than dry air of the same temperature. Therefore, the effects on the physiologic mechanism of adaptation to temperature will be much greater and the demand on the autonomic nervous

system beyond the point of normal adjustment will be greater, thus increasing vulnerability to disease. Kuhn[10] expressed the belief that long exposures to cold produces dryness of the mucous membranes and leads to greater susceptibility to infection of the upper respiratory tract.

Summary

1. The climate of New Mexico is high, dry and sunshiny, with warm days and cool nights.

2. The physiologic consequence of the adaptation of the body to moderate altitudes is of considerable importance in the treatment of respiratory diseases.

3. Heliotherapy has proved of definite value in tuberculosis and other infections in the upper respiratory tract.

4. Extremes of atmospheric heat, cold and humidity have a direct bearing on the incidence of disease, and increase the death rate.

5. The nose is a factor in maintaining the defense mechanism of the body, and the efficiency of the ciliary system and other functions are directly influenced by changes in climate.

6. Tuberculosis of the upper respiratory tract, and chronic sinusitis appear to respond better to treatment in favorable climates.

7. Climate is a distinct factor in the etiology of diseases of the upper respiratory tract and consequently must be considered in their treatment. However, climate is but one factor in therapy. It is not a pancea nor a specific. It should be combined with other forms of therapy, and in treating a disease for which no specific is known, it is sensible to take advantage of every favorable factor.

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Discussion

Dr. Meyer Gorin (Rochester, N. Y.): I wish to commend Dr. Gellenthien on his fine presentation. The fact that climate plays an important role in infections of the upper respiratory tract has been borne out by the experience of every physician and discussed at quite some length in the literature.

It is true that the dry sunny climate of low humidity in the southwestern part of the U. S. exerts a definite beneficial effect upon such infections, but there are several other factors to be considered.

First, which type of patient should be sent to such a climate from the so-called less-healthful parts of the U. S.? It is a known fact that the patients responding best are those with mild infections where the pathologic changes, for example o the sinuses, are confined to the mucous membrane only. It is the general consensus of opinion that the severe suppurative sinus cases, especially those with bone necrosis, do not respond well regardless of climate.

The second factor — when shall these patients be sent elsewhere? Obviously the mild case may be sent at any time pro-

viding, of course, he does not respond well to treatment in his home climate. The more severe suppurative cases, especially those with bone involvement, should first be operated in an effort to institute proper drainage and ventilation. Should their convalescence appear to be prolonged, it might then be advisable to suggest a change to a drier climate of higher altitude with a more even temperature.

Third, is the patient's economic condition such that he can afford to transplant himself to another climate without causing a marked hardship either on himself or others concerned? In his paper Dr. Gellenthien speaks about the cheerful frame of mind of patients induced by th climate of the southwest together with th increased desire while there for outdoo life and the value of rest. It is obvious that the number of patients who have such means at their disposal is quite limited. Transplanting the patient who can ill afford this to a so-called better climate with all its attendant economic worries would naturally defeat one's purpose — the patient's recovery. Although his treatment in his original location may be quite prolonged, or his time of post-operative convalescence be quite extended, still it would probably result in his being a much happier and contended person.

One other factor presents itself. Considering the sinus patient sent to such a high dry climate, how long would it be necessary for him to remain there to be relieved of his symptoms? Once relieved, would this be permanent or would his symptoms recur upon his return to his original environment? I have had some experience with patients who have gone to various sanitaria in the southwestern part of this country who had been relieved either totally or in part of their symptoms while there, but have had a recurrence of those symptoms immediately or shortly after their return to the Northwest.

It would be ideal if we could send all our sinus cases to the more healthful climates, but unfortunately that cannot be done except in a few isolated cases, and, therefore, we must resort to our surgical or conservative methods of treatment to give those patients relief, however prolonged the period of treatment may be.

Dr. C. H. Gellenthien (closing): The influence of climate and environment upon the patient is again arousing serious consideration. Approximately 2500 years have elapsed from the time when Hippocrates wrote his immortal Aphorisms that called attention to the tremendous role of environment and the changing seasons on the patient, to the present when Petersen revived this important concept through his series of splendid monographs, entitled the "Patient and the Weather." Our country is fortunate in having a variable climate from subarctic to subtropic in range in which our population could be adapted or shifted according to its clinical and economic needs. And so long as we are conscious and informed of this possibility we will in the near future recognize the natural health benefits that are obtainable in this vast and rich country of ours. People have talked about the weather for ages, but it is only in recent times that we are actually trying to do something about it — harness it and control it as a remedy for the mixed variety of diseases to which our population is subject or allergic.

Colon Therapy — Worster

(*Continued from page 419*)

polyvalent colon vaccine, showed sensitization indicated by an areola the size of a quarter to one dollar. If this areola fades away quickly, it indicates stimulated immunity and should be repeated every five to seven days as a curative aid to colonic lavage. If the spot is dark and does not fade, the vaccine should be reduced five to ten times by being diluted with normal saline and one-half of one per cent phenol. Further clinical symptoms indicating the need for colonic lavage are foul odor to the breath, stools or perspiration, coated tongue, dingy spots on the skin, capricious appetite and dull frontal headaches.

The cleansing with warm water and ivory soap suds should be given first, then warm solution of one teaspoonful of magnesium or sodium sulphate and sodium bicarbonate each to the pint should be used to promote exosmosis or drainage of the colon, sweeping out bacteria and other toxic substances. These medicines are not absorbed like sodium chloride which may be absorbed and do harm. They produce drainage, relieve pain and toxemia. Those who have not used the sodium bicarbonate and magnesium sulphate solution described will get much quicker and better results by so doing.

THE TREATMENT OF CHRONIC CERVICITIS *

WM. T. BLACK, M.D., F.A.C.S. †

MEMPHIS, TENNESSEE

Chronic cervicitis is one of the most neglected and improperly treated of gynecologic diseases. Failure to inspect the cervix in each pelvic examination is gross negligence, and an inadequate knowledge of its gross pathology and ignorance of the fact that erosion predisposes to carcinoma are inexcusable. Of equal importance is to be familiar with all the modern methods of treatment in order to use the most appropriate in each case. In present day practice, electrosurgery has almost supplanted other measures in the management of chronic cervicitis.

In this country the cautery knife was first employed in cancer of the cervix by Byrne, in 1892. Hunner's report, in 1906, stimulated interest in the treatment of chronic cervicitis by electrocauterization. Dickinson, in 1911, called attention to the use of nasal cautery points, and Hyams, in 1927, described what is known as conization.

The most common manifestation of cervicitis is a leukorrheal discharge. The chief symptoms are pelvic pain, dyspareunia, headache, menorrhagia, and a heavy, bearing-down sensation in the pelvis. Vesical disorders are often associated. The discharge may also give rise to vulvovaginitis with its accompanying symptoms. Infection of the sacroiliac ligaments accounts for pain on palpation in this region. Obstruction of the os by the discharge is frequently responsible for sterility; in the absence of other disease, however, cure of the infection may be followed by pregnancy. In many cases, neurosis is likewise a sequela of cervicitis.

Goodall, Sistrunk, Matthews, Hunter, Moench, Langstrath, and others have reported numerous cases in which symptoms remote from the cervix have been relieved by cure of cervicitis. Obviously, one should exclude other foci of infection before attributing other than local symptoms to an infected cervix.

Treatment

The majority of patients who consult the gynecologist have been treated for a long time for leukorrhea without relief. Others never have had a pelvic examination. Those previously treated have usually received topical applications of various drugs and douches or injections of germicidal agents into the cervical tissue. Alcohol, formerly recommended by Kennedy, and aniline dyes, advised by Moench, are seldom used today. Ross advocates chromic acid, and Tovey and Ground ionization. As Roblee suggests, it is important that the vaginal secretions be maintained at a pH of 4.0 to 4.2. This promotes healing of the more acute infections and is valuable in postoperative care, but will not cure a chronic cervicitis.

In the large majority of cases I believe that chronic cervicitis is more successfully treated by electrosurgery. Plastic surgery and amputation, however, are still appropriate in selected cases. An extensive laceration of the cervix (over 1½ cm. in length) should be repaired by trachelorrhaphy. Amputation is the treatment of choice in the presence of a hyperplastic, cystic process with multiple lacerations in a woman past the child-bearing age. Likewise an elongated, hypertrophied cervix with prolapse in the aged

* From the Department of Gynecology, College of Medicine, University of Tennessee, Memphis, Tenn.
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† Died December 10, 1938.

should be amputated. An elongated, hypertrophied cervix in a young woman is better cared for by Stürmdorf's, or a modified Schröder operation, as abortion or dystocia often follows amputation if the patient becomes pregnant.

With these exceptions, electrosurgery, i.e., electrocoagulation, cauterization, or conization, is the proper method of treatment. Each of these procedures, however, should be chosen according to its suitability in the individual case. Certainly, it is a serious mistake to employ any one of the three in every case, regardless of the pathologic condition. The author prefers either cauterization or conization to electrocoagulation for the reason that a biopsy, (of all the tissue) which should be made in all questionable cases, cannot be obtained as satisfactorily when electrocoagulation is used as by the other two methods. Further, several authorities are of the opinion that infection follows electrocoagulation more often because of the slowness of the sloughing process. When the disease is confined to the endocervix or hypertrophy is of moderate degree and cysts are few in number, cauterization is preferable. These types, which are observed in the majority of cases, may usually be cared for in the office. On the other hand, an extensively hypertrophied cervix with multiple cysts is better treated by conization, and puncture of any remaining cysts with a cautery point. This treatment should be carried out in the hospital and, if need be, under gas anesthesia. After conization, the endocervical space and the vagina may be packed with sterile vaseline strips for twenty-four hours.

For lesions of the endocervix and subjacent tissues, a small cautery point should be used and only linear burns made. In gross hypertrophy, deeper linear burns are necessary.

Chronic cervicitis with a small laceration (less than 1½ cm. in length) is also best treated by cauterization, as the result is equally good and other diseased tissues may be cauterized at the same time.

Of chief importance is the fact that carcinoma seldom, if ever, follows cauterization. This fact has been brought to our attention by Pemberton and Smith, and others. In my experience carcinoma has not developed in many hundreds of cases after cauterization.

A biopsy should invariably be made when there is the slightest suspicion of malignancy. Not infrequently an early carcinoma may be found.

Postoperative Care

Following operation, the patient is advised to expect an increase in the leukorrhea and informed of the possibility of bleeding within ten to fourteen days, and of the probability that the next menstrual period will be prolonged. She is instructed to abstain from coitus for one month. Douches are recommended after two or three days unless the uterus is retroverted and the cervix patent; in the latter event, the douches should be postponed. The patient is also requested to report after ten days, again at the end of two weeks, and once a month thereafter for four months or longer. One should avoid loosening the inflammatory exudate at the first visit, for fear of hemorrhage. A germicide is gently applied to the endocervix at subsequent visits. Beginning one month postoperatively, dilation of the cervix may be necessary at each treatment. A uterine dilator has proved invaluable in preventing and curing stenoses.

Observance of these measures will preclude the development of a stricture. The cervix will be restored to normal function, except that the mucous secretion may be deficient. Since the secretory glands extend up to the internal os, however, it is practically impossible to destroy all the glands; only a few patients, therefore, will complain of dryness of the vagina.

The fact that these glands extend up to the internal os predisposes infection of the myometrium and endometrium near the os owing to interference with uterine drainage and consequent ascension of infection by contiguity of the tissues. One may speak with some authority regarding the prevention of stenosis, yet it is impossible to foretell an acute infectious process, which at times immediately follows operative procedure. By studying the flora of chronic cervicitis one can realize how frequently streptococci and other organisms are present, and can readily understand how an abrasion or tear of the internal os by dilation of the cervix may lead to infection. If the surgeon avoids operation in the presence of an acute infection, corrects a retrodisplacement, and does not invade the uterine cavity, complications will be reduced to the minimum. The only acute postoperative infections observed occurred twelve years ago in a patient with a cervical polyp. The growth was removed, the cervix cauterized, and at the same time dilation and curettage were performed. The patient developed cellulitis and was confined to the hospital for eight weeks. I believe that care not to penetrate the uterine cavity (except in certain rare cases) is responsible for my good results since that time.

Complications

Many writers have reported disastrous results following electrosurgery, among them Hiller, Curtis, Masson and Parsons, Connell and Douglass, and Goodall. Even so, the fact that half the bad results have not been reported may be verified by inquiry among one's confrères. I know of two deaths and many cases of acute infection which have never been reported. No doubt, other surgeons know of similar cases.

The following few cases illustrate the complications observed after electrosurgical procedures.

Case 1. — Mrs. P. was cauterized in Oklahoma during the latter part of April, 1938. Prior to the operation she had apparently been well except for leukorrhea. Immediately afterward she returned to her home in Alabama, where she developed a severe pelvic infection and was extremely ill for six weeks. Subsequently, a large mass was discovered in the pelvic region.

The patient came under my observation June 29, 1938. She complained of pelvic pain and, upon examination, hard, indurated masses were found on each side of the uterus, evidently from a streptococcic infection. She was also anemic. Conservative treatment was advised. Her physician believes that sulfanilamide saved her life.

Case 2. — Mrs. A. was seen a few months following cauterization of the cervix. She stated that her only trouble at the time of the operation was leukorrhea. According to her history, a few days after this treatment a pelvic abscess formed which was drained through the vagina. She had been confined to the hospital for six weeks. Since the operation she had lost twenty pounds in weight and had continued to suffer from pelvic pain, leukorrhea, dysmenorrhea, dyspareunia, constant backache, and extreme nervousness.

Upon examination the cervix was found pointing upward, and a mucopurulent discharge and an erosion were present. The uterus was fixed in retroversion of the third degree. Tenderness and thickening were palpated in the adnexal regions. Laparotomy was the only treatment that could be advised.

Case 3. — Mrs. J. had had undergone electrocoagulation of the cervix which was followed by an abscess, necessitating her confinement to bed for nine weeks. The abscess was drained by me. On culture of the purulent material, both streptococci and staphylococci were found.

Many preventable complications follow electrosurgery because of the patients' failure to carry out instructions. I have been consulted during the past six months by two patients who had retained menstrual blood for three months through closure of the external os. Both were suffering from severe pelvic pain. One had undergone cauterization and the other conization for chronic cervicitis. Both acknowledged their failure to have the

examinations advised by their surgeons. Puncture of the mass with a blunt dilator was followed by prompt relief. The endocervical canal was not stenosed in either case, only epithelization having taken place.

In contrast to the above described cases, many cervices become stenosed, and in some, atresia results, necessitating removal of part of the cervix. If an opening can be found gradual, frequent dilations will restore the patency of the canal to a virtually normal degree. As an example, a patient consulted me four months after deep cauterization. The canal was not apparent. The cervix was split under an anesthetic, and an opening was discovered which admitted only the end of a small cambric needle. Treatment was continued at intervals for six months, with the result that the patient now has a functioning cervix.

Conclusions

1. A pelvic examination is incomplete without inspection of the cervix by one who is familiar with the gross pathologic processes of the cervix.

2. Every erosion of the cervix should be regarded as a potential carcinoma. Biopsies should be made in all suspicious cases.

3. Superiority of electrosurgery has been recognized to an extent as to have relegated plastic surgery to the background, yet the latter still has a definite place in selected cases. Extensive lacerations in chronic cervicitis are best treated by operation. For lacerations less than 1½ cm. in length cauterization is most suitable; the result is equally good and there is less danger of malignancy following this procedure.

4. Amputation of the cervix should not be performed during the childbearing age, but in the elderly an amputation is indicated in the presence of a badly diseased cervix with multiple lacerations. Stürmdorf's, or a modified Schröder operation, is preferable for young women with an elongated hypertrophied cervix.

5. In chronic cervicitis limited to the endocervix, small cautery points should be used. Chronic interstitial cervicitis with moderate hypertrophy and only a few cysts should be treated by deep lineal burns and puncture of the remaining cysts with a cautery point.

6. For a large, cystic, degenerated cervix with extensive hyperplasia, conization is preferable. Cysts not removed by this method may be punctured with a cautery point. If a laceration of moderate degree is present, this should be cauterized.

7. Postoperative care is most important following electrosurgery to prevent atresia or stenosis.

8. Electrosurgery should not be undertaken during an acute infectious process. If the uterus is retroverted, and especially if the cervical canal is patent, the danger of complications is increased. Unless imperatively indicated, the uterus should not be invaded at operation, as dilation and curettage of the uterus materially add to the possibility of infection.

9. Because of the variety of bacteria present in chronic cervicitis, the patient should not be led to believe that there is no danger in either electrosurgery or plastic surgery. A small percentage of patients may succumb from an infection; a larger number are gravely ill for weeks. Others are never completely cured of residual disease following acute pelvic infection.

10. The cervix has remarkable recuperative powers, and if good surgical judgment is exercised in the selection of the treatment of chronic cervicitis, excellent results may be anticipated.

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Discussion

Dr. Melvin A. Roblee (St. Louis): May I take the liberty in discussing these papers to attempt to illustrate from these lantern slides of cervical biopsies, a possible correlation of chronic cervicitis and carcinoma of the cervix. I believe that the hydrogen ion concentration, that is pH, of the cervical environment, namely, the vagina, controls the demarcation of the columnar epithelium from the endocervix, and the squamous from the vaginal portion of the cervix. Vaginal pH is influenced by vaginal infection, estrogenic hormone activity, and artificial environment, for example, douches and contraceptive jelly.

I am interested in cervical lesions in women in the cancer age, which respond only in part to acid replacement therapy applied into the vagina; for example capsules containing beta lactose 80 per cent, boric acid 20 per cent, which give acid fermentable media, producing a vaginal pH 4.0-4.5. Such lesions do not have squamous epithelium covering the area, which was covered by the retreated columnar epithelium, and biopsies show that often squamous epithelial rests deep in the cervical tissue near or in atrophied cervical glands. These areas take the Schiller iodine stain poorly, yet are not leukoplakia.

I feel such cervical lesions are not safe to temporize with in women in the cancer age, and complete hysterectomy or cervical amputation by electrosurgical means should be instituted.

THE EFFECT OF ARTIFICIAL FEVER ON THE BLOOD SULFANILAMIDE LEVEL IN RABBITS *

MURRAY D. LEWIS, M.D.

and

MILLARD F. GUNDERSON, Ph.D.

OMAHA, NEBRASKA

It is now quite definitely established[1] that 30 to 40 per cent of cases of gonorrhea are resistant to sulfanilamide therapy. These sulfanilamide-resistant cases have been shown by us[2] to be usually amenable to artificial fever therapy. But fever therapy given alone in this way does not invariably cure, and moreover, a long and exhausting treatment is required. The practice of combining these two types of treatment has, therefore, become common; and it was with the purpose of throwing more light on what happens in humans treated by this combined method that the animal experiments herein reported were undertaken.

The therapeutic efficacy of sulfanilamide is known to depend on its blood concentration. If this becomes too low the drug is ineffective; if too high, it is likely to be toxic. One of the main purposes of our experiments was, therefore, to determine the effect of fever on the blood sulfanilamide curve. In addition, other observations were made on the animals which might help in assaying the risks of the combined treatment.

Material and Methods

Full grown rabbits weighing 2300 to 3800 grams were used as experimental animals. They were divided into three groups.

Series 1. — Six rabbits were heated on 11 occasions in an air-conditioned fever cabinet modeled on the Kettering Hypertherm. The animal was strapped, abdomen up, to a wooden frame and placed in the previously heated cabinet. Its head remained outside and was cooled by a breeze from an electric fan, while inside the cabinet heated humidified air was circulated around its body. The rectal temperature was checked at least every 15 minutes. The dry bulb temperature of the cabinet was usually kept around 50 C. and the wet bulb about 42 C.; the relative humidity was therefore about 60 per cent.

Using this technic, the rabbits' initial temperature ranging from 100 to 103 F., was raised rapidly to 107.5 and was kept at 107-108 F. for varying lengths of time up to ten hours.

Series 2. — Nine rabbits were each fed 1 Gm. of sulfanilamide per kilogram of body weight and the blood sulfanilamide level estimated at first half-hourly, then hourly, for ten hours. Simultaneously their rectal temperatures were charted. The blood sulfanilamide estimations were done by a micro-modification of Fuller's method.[3]

Series 3. — Fifteen rabbits were each fed 1 Gm. of sulfanilamide per kilogram just as series 2, then immediately placed in the fever cabinet and kept there 10 hours. The rectal temperature soon rose to 107-5 F. and was then kept as close to this level as possible. As with series 2, blood samples for sulfanilamide determination were taken, at first half-hourly, then hourly, for ten hours.

* From the Department of Fever Therapy Research and Department of Pathology and Bacteriology of the University of Nebraska College of Medicine, Omaha.

Observations

Series 1. — Four of the six animals which received fever alone tolerated the treatments well and on removal from the cabinet appeared quite normal throughout the heatings. In two animals the temperature rose above 109 F. and could not be brought down by removal from the cabinet, spraying the ears with water and evaporating it with the fan, and other measures. These two animals soon showed extreme pallor of the exposed mucous membranes, marked restlessness, passage of urine and feces, long labored respirations, and finally death.

Series 2. — These nine animals received sulfanilamide alone, 1 Gm. per kilogram. Their blood sulfanilamide levels taken first half-hourly, then hourly, are shown in table 1. The average blood sulfanilamide level was calculated for each time interval and is charted graphically in figure 1. From this table and

TABLE 1. — *Hourly Blood Sulfanilamide Levels After Feeding Rabbits 1 Gm. Sulfanilamide Per Kilogram of Body Weight.*

Rabbit No.	Time in Hours ½	1	2	3	4	5	6	7	8	9	10
17	27.7	56.2	56.8	57.8	52.8	48.3	53.7	36.8	44.8	43.5	36.8
18	33.3	38.7	36.3	37.9	19.9	15.2	13.2	13.2	8.9	8.0	.....
19	20.8	28.5	34.5	50.0	38.3	.....	23.8	25.0	27.7	26.3	.....
22	30.0	31.2	.....	.....	27.7	Can't get blood.					
23	45.8	45.4	55.5	58.8	59.0	58.8	36.3	33.9	27.4	26.3	.....
25	51.3	44.4	55.5	55.5	58.8	55.5	50.0	50.0	37.0	.....	.....
29	30.0	37.0	37.0	45.0	45.0	38.0	34.0	33.0	31.0	24.0	.....
33	59.0	87.	87.	95.0	66.	62.5	35.7	36.3	29.4	.....	.....
34	27.0	31.0	Can't get blood.								
					Average blood sulfanilamide level.						
	36.1	44.4	51.8	57.1	45.9	46.4	35.2	32.5	29.4	25.6	.....

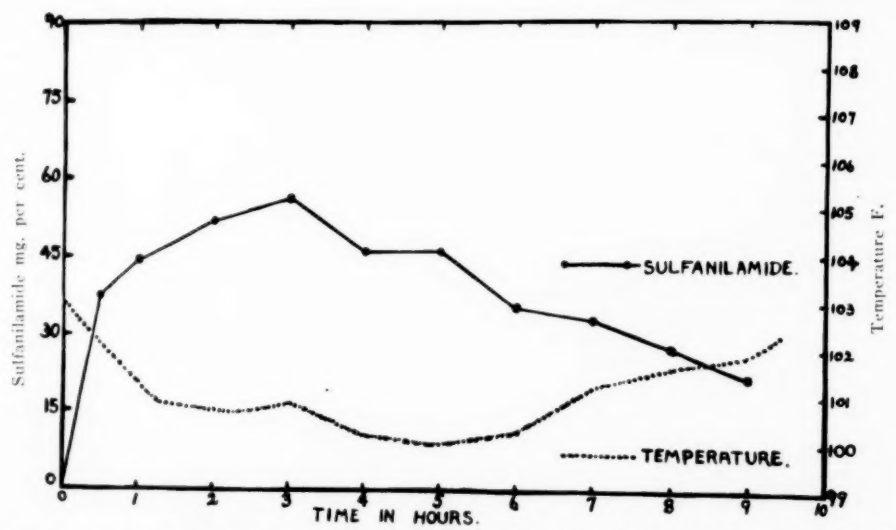

Fig. 1. — Average of blood sulfanilamide levels in 9 unheated rabbits after being fed 1 Gm. sulfanilamide per kilo. The average temperature chart of these 9 unheated rabbits is also shown. Note the fall in temperature, coincident with the rise in blood sulfanilamide.

graph it is evident that the blood sulfanilamide level in these rabbits rose very rapidly, an average of 36.1 mg. per 100 cc. being reached in half an hour. This increased to an average maximum of 57.1 mg. per 100 cc. at the third hour. Thereafter, it fell fairly abruptly, but 25 mg. per 100 cc. was on the average still present after 9 hours.

These animals showed moderately severe toxic symptoms, such as ataxia, cyanosis, coldness to the touch. Their rectal temperature showed a definite fall (fig. 1). However, as the blood sulfanilamide level began to fall these toxic symptoms abated rapidly. None died.

Series 3. — These 15 animals received the same dose of sulfanilamide as did those of series 2, plus 9 to 10 hours of fever at 107-108 F. The blood sulfanilamide levels are shown in table 2 and the average blood sulfanilamide level for each time interval is graphically pictured in figure 2. Examination of table 2 and figure 2 reveals that again the blood sulfanilamide level rose rapidly, although not quite so steeply as in the unheated animals. Hence, the average blood sulfanilamide level at half an hour was 21 mg. per 100 cc. but the average maximum of 36.6 mg. per 100 cc. was not reached until the sixth hour and then there was a slow but definite fall to an average of 20.3 at the tenth hour.

Five animals in this series of 15 died 4½ to 9 hours after the heating was begun. In each instance the mode of death was exactly the same as described for the animals that died during fever therapy alone. The average half-hourly and hourly blood sulfanilamide levels in these five animals that died were as a rule lower throughout their fatal heating than in the ten animals that survived the heating.

Discussion

The experiments with artificial fever alone (series 1) simply indicated that fever induction in rabbits by this method was quite feasible, thus providing a control basis for the experiments with combined fever and sulfanilamide (series 3).

TABLE 2. — *Hourly Blood Sulfanilamide Levels After Feeding Rabbits 1 Gm. Sulfanilamide Per Kilogram and Then Heating 9-10 Hours at 107-108 F.*

Rabbit No.	Time in Hours ½	1	2	3	4	5	6	7	8	9	10
11	32.5	36.6	38.9	41.8	32.3	24.7	39.3	32.3	.....	.....	.....
11	23.0	28.1	25.6	25.0	31.6	25.0	51.0	45.0	44.4	52.8	35.9
15	11.8	19.1	51.3	42.3	42.0	42.9	33.2	40.9	35.0	41.3	31.5
16	20.5	23.1	35.4	41.6	36.2	53.5	52.1	54.0	52.3	45.6	40.8
24	.....	28.6	55.5	35.7	31.2	47.6	31.2	29.4	26.9	29.4	.....
26	33.9	45.4	38.6	40.0	38.3	40.5	39.8	41.6	22.5	15.8	.....
27	12.5	17.2	15.4	14.0	16.4	10.5	8.9	14.3	9.6	6.9	.....
30	10.0	20.8	18.6	15.6	13.9	15.1	15.1	13.5	14.7	10.4	.....
31	38.4	35.7	38.4	45.5	52.6	50.0	58.8	37.4	27.2	.....	.....
32	6.6	8.9	20.8	20.8	20.8	.....	.....	9.6	10.0	9.6	.....
					Average blood sulfanilamide level.						
.....	21.0	26.3	33.8	32.2	31.5	34.4	36.6	31.6	26.9	26.2	20.3

The experiments with sulfanilamide alone (series 2) were also performed to provide a control group for series 3 given combined therapy. The interesting finding in series 2 was the high blood sulfanilamide peak and the extreme speed with which this peak was reached, indicating the tremendous rapidity with which the ingested drug is absorbed. The extreme height of the average blood sulfanilamide curve made it unlikely that much of the conjugated sulfanilamide[4] (para-acetyl-amino-benzene-sulfonamide) was being formed by these rabbits, This was confirmed when attempts were made to estimate the total sulfanilamide by hydrolyzing and then doing the ordinary estimation for free sulfanilamide; on these occasions the value for total sulfanilamide was little different from that for free sulfanilamide alone.

The 15 animals of series 3 who were given the combined treatment showed a slower rising, longer-maintained blood sulfanilamide curve than did those

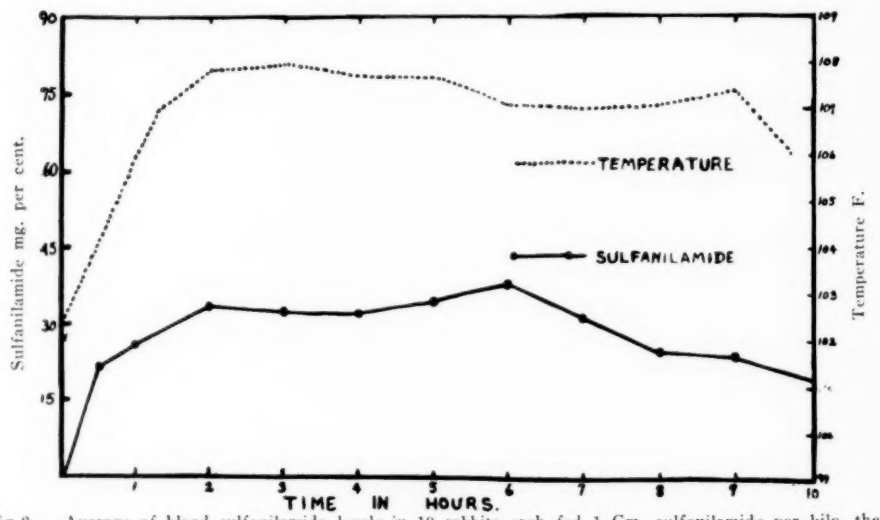

Fig 2. — Average of blood sulfanilamide levels in 10 rabbits each fed 1 Gm. sulfanilamide per kilo, then heated for 9-10 hours at 107-108 F. The average temperature chart of these heated rabbits is also shown. Compare with figure 1 and note the slower rise and fall in the average blood sulfanilamide level.

given sulfanilamide alone (series 2). This suggests that in series 3 absorption of the total amount fed was slowed up and spread over a longer period of time. This finding coincides with the reports[5] of slowed absorption from the human gastrointestinal tract during high fever.

It is, of course, possible that the elevated body temperature may have caused vasodilatation in the urinary tract, leading to increased urinary excretion of the drug. But it was noted that the heated animals voided urine less often and in much smaller amounts than the unheated ones. That increased formation of conjugated sulfanilamide did not occur was again shown by the fact that hydrolysis followed by estimation of total sulfanilamide never showed an appreciable increase, but often, curiously enough, a slight decrease from the free sulfanilamide figure.

Comparison, then, of the two average blood sulfanilamide curves (figs. 1, 2) reveals that raising the temperature of the animals had no other effect on the blood sulfanilamide curve than to cause it to rise more slowly and be maintained longer, due chiefly to slowing of absorption of the drug from the gastrointestinal tract during high fever.

Of the 15 animals given the combined treatment five died. Because of their mode of death and their relatively low blood sulfanilamide level, their death was attributed to hyperpyrexia in the same way that two animals of the six rabbits in series 1 died, which were given fever alone.

In considering the death of these five out of the 15 animals that were given the combined treatment, it must be remembered that they had received a toxic dose of sulfanilamide sufficient in itself to cause symptoms of poisoning. The fact that 10 out of 15 were then able to survive a rigorous heating of 9 or 10 hours at 107-108 F. would indicate that the risks of fever therapy are not as much increased by coincidental sulfanilamide saturation as might have been expected.

Summary

The purpose was to study the effect of artificial fever on the blood sulfanilamide curve in the rabbit and to estimate the risks of combined sulfanilamide and fever therapy.

Six rabbits were given 11 heatings up to 9 hours at 107-108 F. This was usually well tolerated, but two died of hyperpyrexia.

Nine rabbits were each fed 1 Gm. sulfanilamide per kilogram. Half-hourly, then hourly blood sulfanilamide estimations were made, and an average blood sulfanilamide curve obtained over a 10-hour period following ingestion of the drug. There was a steep rise to 36.1 mg. in half an hour and 56 mg. at the third hour, then a rapid fall. These animals all showed quite marked evidence of poisoning.

Fifteen rabbits were each fed sulfanilamide as above, then heated for 9 or 10 hours at 107.108 F. The average blood sulfanilamide curve showed a less steep rise to a lower maximum reached at the sixth hour, then a slower fall. This difference in the curve was attributed to slowed absorption from the intestinal tract in the presence of high fever.

Although five of the 15 animals in this last series died, these deaths were obviously due mainly to hyperpyrexia in the same way that two of the six animals died in the series given fever alone.

Conclusions

1. The blood sulfanilamide level in the rabbit is unaffected by coincidental fever therapy except for a lowering due to slowed absorption of the drug from the intestinal tract.

2. The hazards of combined sulfanilamide and fever therapy in the rabbit do not appreciably exceed those of fever therapy alone.

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.·. EDITORIALS .·.

THE EIGHTEENTH ANNUAL SESSION OF THE CONGRESS

Another year in the life of the Congress is about to come to an end and another milestone of progress in physical therapy will be erected September 5-8 next in New York City when the eighteenth annual session will be held. The committee responsible for the success of the next convention has gone to great pains in order to be able to assure all concerned that the transactions will prove highly informative and exceedingly valuable from both a clinical and a scientific point of view.

The program (elsewhere in this issue), whose preparation has involved great care and energy, contains addresses and special demonstrations of great value to all seriously interested in the scientific advance of our field. Authors of international reputation are scheduled to present the fruits of their labors as clinicians, biophysicists, physiologists and pathologists — labors which will bring to the audiences in the general and special sections all that has been attained by research and experience during the current year.

Like in years past, physical therapy has not rested on its laurels. New problems have again arisen and many of these have been solved in a highly satisfactory manner. It is, of course, impossible within the space of a brief comment to point out the many features that will mark the next annual session, for which reason only a few of the striking presentations can be mentioned at this time.

The manifold problems of gonorrhea and gonococcic infections, to cite one example, have in the past years presented a serious situation both from the standpoint of a complete cure and of the economic loss involved. The same applies also to syphilis. Their great importance can be realized from the world-wide interest, and particularly in America, by official bodies charged with public health. Soon we will learn that with a properly applied technic of pyretotherapy these grave maladies can be definitely controlled within a brief period that was inconceivable before with the available therapeutic methods, which not infrequently were followed by complications more serious in nature than the primary infections themselves.

Arthritis in many of its complex forms still constitutes one of the most distressing problems baffling most practitioners in spite of the resources that have become available from time to time. A solution of many of its perplexing problems can be anticipated from some of the presentations that will be offered.

Cancer and other malignant neoplasms have in the past received considerable attention, with the triad of surgery, electrosurgery and radiation as the therapeutic mainstay for their management. In the next session the participants will have an opportunity of becoming familiar with their treatment by refrigeration as an adjunct which has aroused considerable interest at the last meeting of the American Medical Association during its demonstration by the original proponents of the method, which holds out a promise of great therapeutic efficacy also in certain forms of cardiac disease, tuberculosis and a number of other infectious and degenerative affections.

Another feature meriting mention at this time is that short wave diathermy will be given a new impetus through a demonstration of positive proof that its dosage can be measured and controlled, a problem of extreme importance that has led to many complaints as a shortcoming of this method of treatment, and whose solution has been rendered as simple as it is effective.

Still another feature of the convention will be utilization of certain physical measures applicable for greater diagnostic precision in a number of affections whose exact nature cannot fully be elicited by present diagnostic methods.

From what limited advance information is here conveyed, it can be readily seen that there will be much in store for all who will attend the New York convention this year and that attendance will be rewarded by valuable additions to the sum total of our knowledge of physical medicine and surgery.

The scientific exhibits, too, will prove of exceedingly informative value, the material to be shown having been prepared by men engaged in research with great precision in details, and the commercial exhibits will offer to their visitors a real opportunity to become acquainted with the latest improvements in all sorts of apparatus and appliances attained by engineers connected with firms representing the best in their respective industrial fields.

All sessions and exhibits will be quartered in the Hotel Pennsylvania, but it should not be forgotten that many of the outstanding physical therapy departments of hospitals in New York also will throw their doors open to the participants during and after the convention.

The World's Fair while not a competitive is nevertheless an added attraction, which no doubt most of the participants of the next annual session will wish to visit for their edification. This international exhibit has attracted so many visitors that the hotel accommodations are strained to the utmost. For this reason it cannot be sufficiently stressed that all who plan to attend the eighteenth annual session should without delay notify the office of the Congress in Chicago their intention to attend and to indicate the desired hotel accommodations to enable the proper committee to secure for them rooms and other necessities in order to avoid much effort and waste of time in seeking proper accommodations after their unannounced arrival. We repeat that advance registration with the main office of the Congress should be made by letter at the earliest possible moment.

POST-GRADUATE INSTRUCTION IN PHYSICAL THERAPY

The Congress has throughout its existence made every effort to bring about the teaching of physical therapy as part of the regular curricula in our medical schools. This goal has been achieved, but not as fully as was hoped for, which clearly indicates the need of some post-graduate training in this important discipline. This explains why in recent years the Congress has organized in connection with its annual scientific sessions a seminar (see page 453) which has been generally appreciated by those who participated in it as an intensive, comprehensive and valuable post-graduate course.

That physical therapy is not at a standstill is today generally appreciated. Every year, nay every month, research in one or the other direction of this field brings forth fruits of definite value, not only as strengthen-

ing the scientific basis of this branch of medicine and surgery, but also as a means of enhancing our therapeutic results in every-day practice. This combination of scientific and clinical advance is something no physician interested in perfecting his therapeutic technic for the greater service to his clientele can afford to ignore. In addition students of the biologic and biophysical problems of physical therapy will be afforded an opportunity to enhance their present state of knowledge. Progressive technicians, too, should find in this seminar much of immediate, practical value to them in the exercise of their daily responsibilities.

The annual sessions of the Congress and its official publication have been the means of disseminating as much information as their limited time and scope permit. As already alluded to, it has been felt for some time that there is a great need for a post-graduate review of basic problems and consideration of therapeutic indications and technics in the light of the ever increasing progress in many fields of importance to both the physician and his technician. Just as other disciplines of medicine and surgery have felt and filled the need of post-graduate courses, so the Congress has advocated and instituted a like step for physical therapy, and will continue in this effort until permanent post-graduate schools can be established.

For these reasons another intensive post-graduate course has been carefully prepared and will be given in New York from August 30 to September 2, inclusive, preceding the next annual session of the Congress. This seminar has been especially elaborated both with regard to the teaching personnel and the subjects to be presented in order to assure all participants as much theoretic and clinical information as can be crowded within the space of four full days. Nor will the method of teaching be limited to lectures and conferences, as is customary in every seminar, because the program includes actual clinical demonstrations, the rich resources of New York having been made available to the Congress for that purpose. While limitation of space prevents detailed presentation of the program, we are constrained to select a few subjects merely to convey the information that the participants will be afforded an opportunity to augment their theoretic knowledge and to enhance their therapeutic precision and resourcefulness.

Apart from the actual clinical demonstrations which will be given by such acknowledged authorities as Drs. Bierman, McGuinness, Harpuder, Currence, Weiss, Snow, R. Kovács and Hansson, most of whom will also give special lectures, the subjects of ultraviolet, short wave diathermy, massage and exercise, orthopedics, management of arthritis, fever therapy, to mention but a few, will be thoroughly discussed from every essential standpoint in the sense of clinical applicability by outstanding specialists as Drs. Krusen, Schmidt, Coulter, Ewerhardt, Cipollaro, Silvers, Hartung, Behrend, Titus, Polmer and others — an array of teachers assuring a most profitable and informative course, more detailed and more comprehensive in some respects than was possible to obtain before.

It is essential that all who desire to profit from this opportunity register without delay by writing to the Chicago office of the Congress in order to enable the management to arrange the needed physical accommodations, since the number of physicians and vouched for technicians that can be admitted to the lectures and clinics is rather limited. The time to do this is now.

STERILIZATION OF AIR IN THE OPERATING ROOM

Modern atraumatic aseptic technic in the operating room has almost eliminated infection of wounds in clean cases. However, the introduction of major surgical procedures involving exposure of large raw areas for a long time has again raised the problem of occasional infection. Recently Hart of the Duke University School of Medicine has reported studies during the past five years of efforts to eliminate the occasional sporadic operating room infection. After carefully checking all possible sources of infection, he concludes that the least controlled source of infection was airborne bacteria. Most of the infections were caused by Staphylococcus aureus haemolyticus. The organisms entered the wound from the air rather than from the skin. The air was contaminated by the operating room personnel and patients. All supplies and all procedures in the operating room technic were checked by the culture method and were found to be satisfactory except for the air, which was heavily contaminated with Staphylococcus aureus haemolyticus. The personnel of the operating room and the general population were found at times to have Staphylococcus aureus in the nose and throat in as high as 78 per cent of the cases. A reduction of from 60 to 80 per cent was accomplished by limiting the number of persons in the operating room to the minimum, insistence on masks worn over the nose and mouth at all times, and elimination from the operating room of all persistent carriers of Staphylococcus aureus or of Streptococcus. The rooms were painted frequently and washed daily with an antiseptic solution. By forced ventilation the contaminated air was replaced by clean, washed air taken from above the roof. Despite these measures the number of organisms in the air was not reduced sufficiently to eliminate all infections. In every case of infection in which cultures of the air had been taken, the organism cultured from the wound was identical with the one cultured from the air during the operation.

In a series of 132 individual stages of extrapleural thoracoplasties on fifty-nine patients performed in a field of air sterilized by means of bacterical radiant energy, Hart was able to report a lowering to one-half of mortality due to infected wounds. There was an incidence of 3.8 per cent of skin infections as compared with 33 per cent in a previous series of 100 similar operations. The incidence of postoperative elevation of temperature was lowered so that more than two-thirds of the patients did not have more than two recorded elevations above 38 C. (100.4 F.) as compared to one-third of the patients without radiation who fell in this group. The wound healing has been more rapid and with less reaction when reopened for the second and third stages of thoracoplasty than in those cases in which radiation was not used. In practically all cases postoperative pain has been less and convalescence more rapid.

In a later report the author presents an analysis of the results obtained in 456 clean primary incisions and 86 reopened clean incisions of more than 800 operations performed in the field of bactericidal irradiation. The operations were gastric or intestinal resections, cholecystectomies, mastectomies, appendectomies and amputations of gangrenous extremities. The analysis reveals that postoperative infections have been reduced more than 85 per cent. The occasional death anticipated from infection of a wound did not occur. The number of patients with postoperative temperature above 38 C. has been reduced to thoracoplasties from 68 to 30 per cent, in radical mastectomies from 46 to 34 per cent and in inguinal herniorrhaphies from 36 to 22 per cent. The number of patients with a temperature above 37.5 C. (99.2 F.), for more than four days after operation has been decreased in thoracoplasties from 78 to 22 per cent, in radical mastectomies from 54 to 21 per cent, and inguinal herniorrhaphies from 46 to 14 per cent. There has also been noted a more rapid wound healing, lessened systemic reaction and shortened convalescence.

Bacteriologic studies carried out by Hart and his co-workers, as well as the practical results obtained, seem to establish that air is an important source of contamination in every operative wound. They demonstrated further that sterilization of the air in the operating room can be accomplished by bactericidal irradiation. The method of bactericidal air irradiation may prove to be an important addition to efforts for eliminating infections of wounds in clean primary incisions.'— Editorial J. A. M. A **112**:1072 (Mar. 18) 1939.

SCIENCE, NEWS, COMMENTS

Professor d'Arsonval Honored

On June 25 last the French Society of Electroradiology of Bordeaux and of the Southwest arranged a convention in honor of Professor d'Arsonval in the great savant's home country which was particularly poignant because the 88-year young "father of high frequency therapy" was prevented by illness — temporary we hope — from going to Limoges, where a new wing of the School of Medicine devoted to biophysics was named for d'Arsonval. However, the assembly of several hundred members undertook a pilgrimage to the master's home in Limousin and there paid homage to the Nestor of Electrophysiology and Madame d'Arsonval. Toasts were pronounced there by Professors Rechou, Bordier, Marcland, who is the dean of the Limoges medical faculty, and by the master's personal physician, the distinguished Paris gastroenterologist L. Chauvois. At Limoges after the conclusion of the scientific program, Dr. Chauvois exhibited his now famous moving picture of Professor d'Arsonval at work in his laboratory at Nogent, for which he posed a few years ago, the scenes being reinacted with the same original appliances which were invented and first used by the great scientist in his first experimental work. Dr. Chauvois has shown this film in Brussels in person and explained to an enthusiastic audience viva voce the various procedures. The film has since been exhibited in Athens, Ankara, Bucharest and soon will be shown at the New York World's Fair. The ARCHIVES is glad to report that Professor d'Arsonval has stood the ordeal of such an unusual ovation as was accorded him at his home, and that his recovery is looked forward to with confidence by Dr. Chauvois.

Winner of the 1939 Mississippi Valley Medical Society Contest Announced

The second annual Essay Contest of the Mississippi Valley Medical Society, "for the best unpublished essay on a subject of practical and applicable value to the general practitioner of medicine" has been awarded to Frederick F. Boyce, Assistant Professor of Surgery, Louisiana State University. The winner receives a $100.00 cash prize, a gold medal, a certificate of award and an invitation to present his essay before the annual meeting of the Mississippi Valley Medical Society. Dr. Boyce will address the Society on the subject of his winning essay "Toxic Thyroid Disease as a Surgeon Would Have the General Practitioner Conceive It, With a Special Note on the Liver Factor," at Burlington, Iowa, on September 27, 28, 29. His paper will be published in the January issue of the *Mississippi Valley Medical Journal* (Incorporating the *Radiologic Review*). Because of the nation-wide interest in the Essay Contest it will be repeated again next year, but plans for the 1940 contest will not be available until November.

Connecticut Forms State Physical Therapy Society

One of the latest and perhaps largest state societies of physical therapy was recently formed in Connecticut with 125 charter members. The officers elected are: Harry E. Stewart, M.D., President; Robert E. Peck, M.D., First Vice-president; Charles Edlin, M.D., Second Vice-president and Karl Bretzfelder, M.D., Secretary-Treasurer.

At the spring meeting of the Connecticut State Medical Society, the Physical Therapy Society was formally made a Section with the same officers in charge. A paper on "Electrically Induced Fever" was presented by William Benham Snow, M.D., Columbia Medical Center, New York.

New York Fair Medicine and Public Health Exhibits Most Popular

The Medicine and Public Health exhibit, which its sponsors had hoped would prove of interest to the more serious-minded among Fair visitors, has upset all advance calculations and confounded the experts by "packing 'em in" as fast as any five-star hit. Actual attendance through June 15 was 1,958,909. It would have been larger had human beings been more compressible, because on some days the doors had to be closed during peak hours. On one day this exhibit actually drew 49 per cent of the total paid Fair attendance, which means that every other visitor to the Exposition saw the talking skeleton, the Carrel-Lindbergh heart apparatus and other features of the exhibit.

Cancer Discoveries Under Grants Can Be Patented

Cancer discoveries made with Uncle Sam's aid may be patented, the National Advisory Cancer Council has decided. When a scientist aided by federal cancer funds makes a discovery he will consult with the Surgeon General of the U. S. Public Health Service to determine whether it should be patented, and if so, how. Patenting is a vexing problem in medical circles.

Atom smashing neutron ray experiments at the University of California, directed at treatment and more control of cancer, were given $23,000 more support. Surveys of cancer treatment and centers by the American College of Surgeons were implemented by $7,500.

Three new centers for training physicians in cancer work were approved at Duke University, Durham, N. C.; Wayne University, Detroit, Mich.; and the New England Deaconess Hospital, Boston. — *Science News Letter.*

National Academy of Science Discuss Advances in Vitamines

Vitamin B_1 and liver extract have been used successfully in the treatment of major trigeminal neuralgia or tic douloureaux, a nervous disease characterized by agonizing pains in the face, usually on one side. The new treatment, and studies on the physiology of the malady, were made known to the meeting of the National Academy of Sciences by Drs. H. Borsook, M. Y. Kremers and C. G. Wiggins of the California Institute of Technology.

At first, treatment consisted of daily injections of vitamin B_1 without the addition of the liver extract.

"Ten cases have been under observation for 11 months; 42 cases for six months," Dr. Borsook reported. "Of the cases observed for 11 months seven became practically symptom-free in three months after treatment was begun and have remained so without further injection of vitamin B_1. Two improved to a lesser degree. One showed no improvement. Essentially the same results were observed in the other 42 cases under observation now for six months."

Ten cases that failed to improve when treated with the vitamin alone were given a combination treatment of vitamin B_1 and liver extract injections. The doses were large, and frequently administered. Marked improvement was noted in from three to four months. No cases have yet been treated with liver alone.

In concluding, Dr. Borsook stated, "There are among the cases showing marked improvement a number over 70 years old who have had the disease in some instances for more than 20 years."

Can Foretell Weather

"I would like to convince the Academy and the public that there is an untried method of forecasting weather which seems competent to predict principal weather changes for two weeks in advance."

With this challenging statement Dr. Charles G. Abbott, secretary of the Smithsonian Institute, opened his report to the National Academy of Sciences. And he concluded by calling for the inclusion in the national budget of $200,000 a year for the maintenance of ten special observatories for watching the changes in solar radiation which he declared precede major weather changes on the earth.

"It seems too bad," he said, "that with a Government budget of many billions of dollars, this almost trifling amount is not available to try this promising method of long-range weather forecasting."

Dr. Abbott exhibited charts showing an apparent close correlation between relatively small shifts up and down in solar radiation intensity and large weather changes during the days that followed. The correlation between the two sets of data is eleven times that to be expected on the basis of pure chance, he declared.

The amount of change on earth is out of all proportion to the amount of change in the solar radiation, Dr. Abbot pointed out. Changes in solar radiation average only seven-tenths of one per cent, he said, but they are often followed by changes of ten or twenty degrees Fahrenheit in terrestrial temperatures.

Control of Evolution

Chemical control of evolution has now been extended to molds and other fungi, it was reported by Drs. Charles Thom and Robert A. Steinberg of the U. S. Department of Agriculture. They were impelled to try to change the course of heredity in these lower plants by the recent successes in changing the genetics of flowering plants with the drug colchicine.

Colchicine and other chemical reagents had no effect on the several strains of mold on which the two experimenters worked. However, when they grew their cultures on a medium containing sodium nitrite, changes in character that appear to be stable and permanent developed.

Vitamin Need Increases

Sterility due to lack of vitamin E, the fertility vitamin, becomes increasingly difficult to overcome with advancing age, it was shown in experiments with rats conducted by Prof. Herbert M. Evans and Dr. Gladys A. Emerson of the University of California.

Young female rats reared on a vitamin E free diet are unable to bear young. A comparatively small amount of the vitamin will enable them to reproduce, if given in early maturity. At eight months of age, this initial curative dose no longer suffices, but if doubled or trebled the rats will still become sexually normal. At a year, the dose has to be multiplied by eight or ten to be effective. In still older rats, embyro development can be initiated, but is never carried through to birth, no matter how much of the fertility vitamin they are given. — *Science News Letter.*

Atom Smasher Helps to Study Mystery of Body

While the giant atom-smashing cyclotron apparatus of the physicists is primarily designed to study the structure of the atom it is rapidly being turned on more practical ends, which have direct applications in the animal and human body.

One of the mysteries, which the cyclotron atom smashing is helping to solve, is the role of the chemical known as glutathione in the human body. This chemical is a sulfur compound apparently composed of known amino acids — glycine, cysteine and glutamic acid. But every effort so far to produce glutathione synthetically out of its parts so far has failed. Yet knowledge about its role and a method of synthesis are vitally needed because glutathione controls the behavior of important enzymes in the cells of the body.

Newest feat of scientists at the Biochemical Research Foundation of the Franklin Institute in Philadelphia is to create radio-active glutathione. This is done by growing yeast cells in a synthetic medium in which radio-active sulfate (obtained

by cyclotron bombardment) is the only source of sulfur.

Under these conditions the yeast cells build up radio-active glutathione that can readily be detected in extremely small amounts by Geiger counters sensitive to disintegration radiations given off.

Reports the Foundation's Director, Dr. Ellice McDonald:

"Radio-active glutathione will be of great value in studies on the fate of this substance in the human body, as there is no knowledge of the mechanism of the action of this important body substance. With radio-active glutathione it will be possible to trace its course and possibly to explain the mechanism of the action. If this is done, it will be one more step towards explaining the riddle of life." — *Science News Letter.*

Sulfapyridine Shortens Pneumonia in Children

The new drug sulfapyridine apparently shortens the course of pneumonia by three or four days when used in treating infants and children. Six Cincinnati physicians report on the effect of the drug on the pneumonias of infancy and childhood after a trial period at the Children's and the Cincinnati General Hospitals, Cincinnati (*J. A. M. A.*, April 15). Of 70 young pneumonia patients, half were given sulfapyridine and the others were used as controls. It was demonstrated that the fall in temperature and the clinical recovery were significantly earlier in the sulfapyridine group than in the control group. The optimum dosage needs further study, and the series of cases was too small to permit an evaluation of the effects of sulfapyridine in preventing the complications of pneumonia, according to the six authors of the article. They are: Drs. Armine T. Wilson, Arthur H. Spreen, Merlin L. Cooper, Frank E. Stevenson, A. Graeme Mitchell and Glenn E. Cullen. — *Science News Letter.*

Several Wines Blended to Make American Champagne

Champagne can now be made in the United States rivaling that of European origin, thanks to the skill of American chemists.

Its manufacture was described before the food and agricultural division of the American Chemical Society meeting, in a report of Dr. D. K. Tressler of the New York State Agricultural Experiment Station, Dr. H. E. Goresline of the U. S. Department of Agriculture, and F. M. Champlin, owner of a large wine company in New York.

Since the white wine used as a base must be of extremely high quality, several white wines, including Catawba, Delaware, Elvira, and Dutchess, are blended to obtain the desired excellence.

Selected champagne yeast is added, together with the exact amount of sugar necessary to ferment and yield a pressure of 100 pounds to the square inch in the finished product. Sealed in the dark-green bottles, the champagne is then placed in cellars where the temperature can be carefully regulated — a necessary consideration in fermentation control.

It is during this secondary fermentation and aging that the champagne gains all of its clear, sparkling brilliance. The bottles are placed in an almost inverted position and shaken lightly as well as turned each day. This causes all the sediment to collect in the neck.

When all the sediment has collected, the neck of the bottle is frozen, and the frozen wine and sediment quickly removed. Sirups containing cognac and other flavorings are added, and the bottles again sealed, this time until they are re-opened upon some festive occasion. — *Science News Letter.*

Symmetry of Human Body Is Varied in Fingerprints

Mother Nature in a gracious mood has provided her human sons and daughters with a pleasant symmetry. We expect right eyes to be like left eyes in color, shape, and movement. The right side of the mouth is like the left, the right ear like the left and the hands and feet like each other anatomically.

Yet every once in a while, the general pattern of symmetry breaks down in some detail. Occasionally we see a girl with a beautiful blue eye on one side of her face, but when she turns we find the second eye of an entirely different hue, perhaps hazel or even brown.

Shoe salesmen report that the two feet of the same person are likely to differ somewhat in size, so that they recommend that a purchaser try on both shoes before buying.

Study of fingerprints has revealed an interesting variation of symmetry among the fingers. In the more general anatomical features, one hand is a sort of mirror image of the other. The two thumbs are alike and then each finger is like the corresponding finger of the other hand.

Not so with the fingerprints, however. In most races so far studied, the fingerprints of the thumb are more like the fingerprints of the ring finger on the same hand than they are like those of the opposing thumb, Dr. Heinrich Poll, fingerprint expert of Berlin, reports in the scientific journal, *Human Biology*. European peoples have this pattern of fingerprint symmetry and so do the Mongolian races. For certain races of Africa, however, and for the Negroes of Jamaica and Cuba, this rule breaks down. In these peoples, each digit tends to be more like the corresponding one on the other hand.

Such findings have practical implications for identification officials. — *Science News Letter.*

Nitrogen is Breathed in New Treatment for Mentally Ill

Mentally sick patients are now being rescued from the world of the insane by the simple and comparatively safe measure of breathing nitrogen. "Encouraging results" of this new, non-shock treatment for insanity in a small series of cases were re-

ported by Drs. H. E. Himwich, F. A. D. Alexander, Basile Lipetz and J. F. Fazekas, of Albany, N. Y., Medical College and Union University to the Federation of American Societies for Experimental Biology, meeting in Toronto.

The new treatment achieves its effect by the same mechanism as the drastic insulin and metrazol shock treatments. This is by decreasing the metabolic activity of the brain. The nitrogen inhalation treatment, however, is easier to give than insulin shock and does not produce the fearful convulsions of metrazol treatments which are dreaded by both patients and physicians.

With the new treatment, patients breath nitrogen long enough to deprive the brain of its oxygen supply for about five minutes. These treatments are given three times a week for a period of about three months.

Cutting down the oxygen supply to the brain reduces its metabolic activity. Metrazol does the same thing by temporarily arresting breathing movements. Insulin shock does it by depleting the sugar supply to the brain, without which the brain cannot use oxygen.

The fact that metrazol and insulin shock treatments both produced this effect of decreased metabolic activity was discovered a year ago by a University of Toronto research team under the leadership of Sir Frederick Banting and Dr. G. Edward Hall. At that time Dr. Hall predicted that neither insulin nor metrazol would be the last word in treatment of schizophrenia and that a better and less severe remedy would be found to replace them. The nitrogen inhalation treatment seems now to be that remedy.

Insulin Sobers Alcoholics

Drunks, not ordinary ones but those who were completely "out" in serious alcoholic coma, were sobered up in two hours or less and able to walk alone within four hours by injection of sugar and the diabetes remedy, insulin, Drs. Walter Goldfarb, Karl M. Bowman and Samuel Parker of Bellevue and King's County Hospitals, New York, reported.

This sobering-up treatment works for any intoxicated person, Dr. Goldfarb said, but the results are most startling in cases of acute alcoholism. Although he and his associates have tried it on persons not acutely intoxicated, it is only used for serious cases where there is danger of the patient dying or being very ill for a long time. The ordinary drunk, Dr. Goldfarb pointed out, will recover without any treatment. But this insulin-sugar treatment can be given by any physician in his office or the patient's home; it is not dangerous, and there is no reason, Dr. Goldfarb said, why it should not be given to any intoxicated person.

Insulin alone had no effect, the New York investigators reported, and sugar alone only helped in cases of severe intoxication where the amount of alcohol in the blood was over 300 milligrams per cent. Burning of alcohol and its consequent disappearance from the body, it was suggested, may be speeded by catalytic action of simultaneous oxidation or burning of sugar. — *Science News Letter.*

Biblical Plagues Still Weaken Egypt's Health

The Biblical plagues still afflict the land of Egypt.

For from being a never-repeated reign of terror, the plagues with which Moses frightened a Pharaoh into releasing the Israelites were fearful because of their familiarity. And they still recur in more or less serious form, like our own epidemics and other trials.

The sequence of health hazards which the Nile brings each year was deplored recently before the World Federation of Education Associations by a physician of the government health service in Cairo, Dr. Isabel Garvice.

Pointing out the Biblical antiquity of these conditions, Dr. Garvice said that every August, then and now, the rising Nile turns blood-red from its load of heavy mud.

To drink this water is to invite sickness and death. Yet the Egyptian peasant is convinced that drinking well water would turn his hair gray and make him old before his time. Rather than risk such calamities, he clings to his year-round habit of drinking from river or canal, and the blood-red water brings the plague of boils. The children, says Dr. Garvice, often have ten to twenty boils on face and body.

As the flood waters lessen, come the plague of frogs, flies, and death to the babies.

Even the three days of darkness which enveloped the earth in the Bible siege of plagues, is still experienced. The darkness takes the form of sandstorms, which are still terrible in upper Egypt and still last three days.

"All these things," said Dr. Garvice, "are put down to the will of God and accepted with resignation by the peasant."

But the Egyptian government is determined to cope with its plagues. Children, under compulsory schooling, are being taught health habits and given medical attention. Rural villages are shown hygiene films. Medical centers are established. The conquest of the plagues is advancing — slowly. — *Science News Letter.*

Erratum re: Infra-Red Photography in the Diagnosis of Vascular Tumors

Owing to a printing error in Dr. Ronchese's article entitled "Infra-Red Photography in the Diagnosis of Vascular Tumors," figure 4, on page 356, June (1939) issue of ARCHIVES appeared in an order reverse to the legends. We regret this inadvertent mistake.

THE STUDENT'S LIBRARY

FEVER AND PSYCHOSES. A STUDY OF THE LITERATURE AND CURRENT OPINION ON THE EFFECTS OF FEVER ON CERTAIN PSYCHOSES AND EPILEPSY. By *Gladys C. Terry,* Research Assistant in Neurology, Neurological Institute of New York; Columbia University. Formerly Research Assistant in Psychiatry, Henry Phipps Clinic, Johns Hopkins University. Cloth. Price, $3.00. Pp. 168. New York and London: Paul B. Hoeber, Inc., 1939.

Isolated examples of spontaneous recovery of certain serious mental and physical maladies after intercurrent febrile attacks have stimulated intermittent research and constant interest in fever treatment in the hope that hese spectacular experiences would eventually be explained on a rational basis. This work dedicated to the distinguished neuropsychiatrist, Frederick Tilney, late medical director of the Neurological Institute and sponsored by President of its Board, Mr. Floyd B. Odlum, was written by a former research student in psychiatry at Phipps Clinic, Johns Hopkins Hospital, under Adolf Meyer. The report constitutes an intensive research into the literature and the problems of the effect of fever on certain psychoses and epilepsy. A foreword by Dudley Roberts explains the reasons for this undertaking, and also points to certain favorable implications and trends of fever as a therapeutic measure. The work sketches the development and interest in fever therapy from the time of Hippocrates and devotes especial attention to contributions of the last 150 years with reference to its induction by infective measures, chemicals and electrophysical procedures. Over 500 references are included, an indication that the literature has not only been critically surveyed but also well selected. The exposition clearly demonstrates that both psychotic and somatic structure have shown definite amelioration of morbid behavior and symptoms under controlled artificially induced hyperpyrexia, or by febrile shock therapy. It traces its therapeutic development through various countries from the middle of the last century to the present year. The text proper is divided into four sections, the first being an introductory survey and the second dealing with the problems and action of intercurrent natural fevers, such as functional psychoses and epilepsy, and the tabulation of 446 cases including a numerical notation of the literature from which these have been drawn. The third section critically reviews the nature, physiologic and pathologic reactions and implications of the clinical use of artificially induced fevers in certain mental and nervous disorders, such as its action on (1) affective psychoses, (2) schizophrenic psychoses, and (3) epilepsy. Finally the author evaluates the entire problem with reference to its therapeutic possibilities. The work as a whole is presented in a style highly informative and lucid in manner, being both critical in its analysis of data, and conservative as well as encouraging in its consideration of the possibilities of modern fever therapy in psychotic and somatic affections. It is an invaluable reference for students of fever therapy.

PHYSIKALISCHE THERAPIE. RICHTLINIEN F. DEN PRAKTISCHEN ARZT. *Von Professor Dr. H. Lampert.* Direktor des Universitäts-Instituts für Physikalische Therapie, Frankfurt a/M., sowie des Universitäts-Instituts für Quellenforschung und Bäderlehre, Bad Homburg, Chefarzt des Kreiskrankenhauses Bad Homburg (volume 25 of the series "Medizinische Praxis"). 131 illustrations. Paper. Pp. 256. Price, Rm. 13.50. Dresden and Leipzig: Theodor Steinkopff, 1938.

There are many technically good books and monographs in many languages on physical therapy, but to the best of present knowledge few there are that can compare in frankness, enthusiasm and scientific thoroughness with the present text-book, which carries the modest subtitle of "directions for the general practitioner." It is by far more than that, for even men who have become expert in many or all phases of physical medicine will find in this book a great stimulus for further research, because of many technical data critically weighed and illuminated that are lacking or have been side-stepped in other similar works.

The author is a great teacher imbued with high ideals, but above all a physician in the finest sense of the word, who wants none but highly educated colleagues to venture as functionaries in the sphere of physical medicine. Throughout his book Lampert teaches and preaches a sermon of conservative and rationalistic practice. He raises his voice in admonition with reference to loose opinions inculcated in students by incompetent teachers and pseudo practitioners, and insists that the actual clinician should be the guide and have the last word in physical therapy with regard to its indications and effectiveness according to the manifold conditions and circumstances encountered at the bedside.

All who are familiar with the depressing fact that the present regime in Germany has taken into its benevolent protection that group of semi-illiterate charlatans who without any knowledge of the merest rudiments of anatomy and physiology proclaim themselves capable of curing all diseases, even syphilis and cancer, by crude applications of water, herb-salves and other bizarre agents, will have to read between the lines of this book to appreciate the author's efforts to separate the science of physical therapy from the government-protected natural healing "science," which opposes all forms of medical training in the universities. Nor is this situation limited to Germany, for quackery has boldly challenged or attempted to disrupt by unethical means the science and conservative practices gained by research and experience.

The author clearly states that certain phases of physical therapy, such as dietetics, spa cures, x-ray and radium therapy have not been included, because they have been treated in other publications of this series. The text is divided into three sections. In the first Lampert exhaustively discusses the scientific basis of treatment by heat and cold, certain medicinal baths, massage and gymnastics, respiratory gymnastics, light treatment, radium emanotherapy, electrotherapy, which embraces diathermy and short wave therapy as well as galvanotherapy and other low frequency currents. The second section presents in alphabetic order the diverse technics, while the last section discusses the groups of diseases in which physical therapy is indicated and useful.

In the available space it is impossible to do justice to the book by singling out even the most striking teachings. Suffice it to say that the author has exposed fallacies, has warned against false claims by interested parties, not excepting industrialists, and throughout is frankly constructive in intent. Such a work must be read in toto and then re-read for particular subjects in which one happens to be interested. And throughout the "whys" and "wherefores" are approached with uncanny precision, so that many reactions, not excepting that of hyperemia, are presented in a new light. Certainly this book is a standard work for the application of physical therapy in a scientific manner, freed from guesswork and empiricism.

TRAUMA AND INTERNAL DISEASE. A BASIS FOR MEDICAL AND LEGAL EVALUATION OF THE ETIOLOGY, PATHOLOGY, AND CLINICAL PROCESSES FOLLOWING INJURY. By *Frank W. Spicer*, A.B., M.D., F.A.C.P. Cloth. Price $7.00. Pp. 593 with 43 Illustrations. Philadelphia: J. B. Lippincott Co., 1939.

The purpose of this book according to the author is to present a careful study of the role of trauma in the causation of disease of the viscera and bodily structures, and a discussion of the etiology, pathology, clinical processes and end-results of serious or apparently trivial injuries, together with their early or tardy manifestations and effects upon a healthy organ or structure and also upon organs or structures that present evidence of preëxisting disease. There are chapters on the relation of trauma to the brain, spinal cord, chest, tuberculosis, heart, blood vessels, abdomen, gastric and duodenal ulcers, liver, pancreas, spleen, appendicitis, genito-urinary system, female genital tract, air embolism, diabetes, exophthalmic goitre, leukemia, arthritis, syphilis and tumors. When the question of trauma as the etiologic factor of a disease is to be answered, painstaking, impersonal and scientific inquiry must be made before the answer is given. The text lucidly points the way of fulfilling such a responsibility frequently placed upon general practitioners and specialists. The subject itself being of practical importance, especially today when experts are called upon to determine the justification of many claims for industrial compensation for real, imaginary or pretended affections claimed to be the result of injury, the book fills a real want, and is, therefore, recommended as an authoritative guide in the field covered by the author.

SPORTS FOR THE HANDICAPPED. By *George T. Stafford*, Ed.D., Associate Professor of Physical Education, University of Illinois. Cloth. Price Trade $2.75. Text $2.00. Pp. 302. New York: Prentice-Hall, Inc., 1939.

Stafford believes that an adapted sports program extends beyond the correction of physical defects. The student is first approached on the basis of sport activities in which he would like to participate, and he is informed of those sports which may tend toward the correction of handicaps. Specified exercises are presented in such a manner that the handicapped could perform a certain sport better. While no attempt may be made to secure any correction of a defect, the handicapped boy or girl is guided in those socializing activities which will eventually lead to their adjustment in a social order characterized by an increased range of environmental variations. The author is qualified by long experience as a teacher and practitioner in his special field to present this method of sports for the individual with physical defects. It is highly recommended to physicians, physical therapy technicians and physical educators interested in the management of the physically handicapped.

KÜNSTLICHE FIEBERZEUGUNG MIT KURZWELLEN. KURZWELLEN-HYPERTHERMIE. Von Dozent Dr. med. habil. *Ernst Raab*, Berlin. Boards. Pp. 158 with 36 illustrations. Price, $5.50 and RM. 6.50. Leipzig: Georg Thieme Verlag, 1939.

This volume is the first representative and detailed exposition on short wave hyperthermy in German, by one whose past contributions and original labors have singled him out as foremost among the students in this rapidly expanding branch of therapy. It is an informative documentation of the author's pioneer endeavors in perfecting both his scientific orientation and mechanical experience and technic with reference to the theory and action of controlled systematic high fevers and its application to a wide variety of diseases resistant to classic procedures. The author indicates that because German medicine has been hesitant in recognizing the advantages of controlled fever treatment in preference to the methods of "shock" therapy at present in vogue, the difficulties encountered were all the greater because of the unsympathetic views of so-called vested authority. Accordingly, technical handicaps were overcome with the aid of an engineer, Hoffmann, and other faithful coworkers by whose efforts satisfactory apparatus were built and technics and methods developed. The work therefore offers an original point of view and provides a conservative evaluation of the author's personal experiences. To this should be added his exposition of the elaboration of the mechanism of certain defensive reactions, a detailed discussion of comparative methods and a review of case histories to indicate the value and the limitation of the technics employed. The author frankly acknowledges the

indebtedness of medicine to the inventiveness of American science in this field, a recognition all the more appreciated because seldom acknowledged by our colleagues abroad. It is therefore most surprising that the work abounds in richest references to American workers, the names of whom could have been materially increased, albeit the present selection is fairly representative. The format of the book is as artistic as it is scientifically impressive and one can well here reiterate the praise of clear type, beautiful illustrations and the paper selected by a fully cooperative publisher. Accordingly, there is much of value in this work, which in its final analysis is a contribution containing original data of value to this procedure, and must be regarded as authentic, conservative and progressive. It is a contribution original in scope rather than a routine compilation of the opinions of other men, and for that reason adds to the stature, dignity and value of present views of short wave therapy as a means of systemic high fever production alone or in combination with the newer drugs used in clinical medicine. It is unfortunate that unfamiliarity with foreign spelling has permitted many typographic errors and that an index was omitted from a text that deals with clinical states as widely removed from each other, but these are shortcomings which do not seriously detract from the scientific and clinical value of the context.

WORTH'S SQUINT OR THE BINOCULAR REFLEXES AND THE TREATMENT OF STRABISMUS. Seventh Edition. By *F. Bernard Chavasse*, M.A., D.M. (Oxon), Surgeon, Eye Department, Liverpool Eye and Ear Infirmary; Lecturer in Ophthalmology, University of Liverpool. Pg. 688. Washable Fabric. Price, $8.00. Philadelphia: P. Blakiston's Son & Co., Inc., 1939.

This is a new book written in the hope that it may take the place which was held by "Worth's Squint" for no less than thirty-five years. Since there has been a new conception of the binocular reflexes and of their development as a new pathology, all varieties of squint appear as perversions or subversions of the normal binocular reflexes by various obstacles operating during and after the developmental period. The author believes that certain changes in views due to advanced thought, will be more acceptable to the younger men rising in the specialty of ophthalmology. Particular reference in this connection is made to the surgical aspect — "This surgery is directed, as in orthopedic surgery proper, to two ends — first, the most rapid and complete resumption of normal activities, and, secondly, to preventing the development, both of secondary deformities locally and of secondary perversions of the central nervous control." It is interesting to note that the author is open in his expression of the value of orthoptic training when he states: "Although the surgeon may be sufficiently scientific to detect much balderdash and charlatanry, in orthoptic training, he must assuredly rely upon refined and laborious diagnostic methods to assist him in his operative and other treatment." The book as a whole requires study rather than casual reading. The style may appear uninteresting to the American reader as it deviates from the stereotyped presentation. In perusing a work of this type, consideration must be given to individualistic preferences of dealing with so large a subject as squint. To the ophthalmologist this volume should prove of unusual interest.

CORRECTIVE PHYSICAL EDUCATION. By *Josephine Langworthy Rathbone*, Ph. D., Assistant Professor of Physical Education, Teachers College, Columbia University. Second Edition. Revised. Cloth. Price, $2.50. Pp. 305. Illustrated. Philadelphia and London: W. B. Saunders Company, 1939.

This is the revised second edition of the popular book on corrective physical education. The author aims to convince the student of health and physical education that one of his greatest concerns should be to help children and the young to build efficient and beautiful bodies. The second aim is to furnish the student with some fundamental facts and principles upon which to build a sound program of corrective or reconstructive health and physical education. The author believes that every department of physical education should cooperate with a physician who will check on the methods of those who deal with reconstructive problems and give advice and guidance. This second edition brings the text in line with today's advances in corrective physical education. There are new chapters on "Fatigue and Conscious Relaxation" and "Physical Recreation for the Handicapped." This book is highly recommended to students of physical education and physical therapy.

INTERNATIONAL ABSTRACTS

Three Hundred Cases of Extensive Conization of the Cervix. Robert J. Crossen, and George J. L. Wulff.

Am. J. Obst. & Gynec. **37**:849 (May) 1939.

The series comprised both private and ward cases. The ward cases were followed after operation in the Out-patient Department and follow-up information on the private cases was obtained directly from the staff surgeons of Barnes Hospital. The three questions which were asked were: (1) Was there any abnormal postoperative bleeding? (2) Were there any cases of postoperative stricture? (3) Were there any pregnancies following conization?

The procedure was carried out in combination with curettage and radium therapy, vaginal plastic operations and abdominal operations.

It is evident that a sufficiently large number of cases have been done in combination with the various procedures mentioned to show that these combinations are not harmful to the patient. Conization offers a rapid efficient method of caring for the cervix in two types of conditions. First, in cases of supravaginal hysterectomy where the cervix shows a mild cervicitis which is not extensive enough to warrant the additional strain of a complete hysterectomy, and second, in patients with a bad cervix where operative difficulties, or the patients condition, contraindicate its removal. No difficulty was experienced in doing the conization following abdominal operation, and it is preferable and can be done later before the patient leaves the hospital.

Since 1935, the importance was stressed of having the patient come in for conization immediately after the period so that the cervix will have about three weeks in which to heal before the onset of another period, and in this series the majority of cases were operated in the postmenstrual period, which proved an important factor in the prevention of postoperative bleeding.

Sutures should always be used in the following types of cases: (1) Wide conizations where there is a good deal of eversion, regardless of whether they bleed at the time or not. (2) When there are bleeders at the time of conization. (3) When the radium of a stem pessary is used. The Sturmdorf suture has been found to aid the inversion and prevent late bleeding.

Strictures should not occur in conization if deep coagulation is avoided. A small rubber tube should be left in the canal for seven days in the more extensive cases.

Postoperative bleeding in conization can practically be eliminated by the proper selection of time for operation and the use of sutures when indicated.

There have been no difficulties encountered in the delivery of patients who had previous extensive conization.

Radioactive Ointment as a Method of Surface Radium Therapy. Albert Eidinow.

Brit. J. Derm. & Syphil. **51**:216 (May) 1939.

The naevi treated were old cases which had had previous treatment, and new cases which did not blanch readily. The area selected for treatment was covered by plaques made of cellophane and filled with radioactive ointment containing 1 mc. per c.c. They were attached by pieces of adhesive strapping and applied for three to four days. A full erythema reaction appeared two to three weeks later. This area was exposed to erythema doses of ultraviolet rays from a quartz vacuum mercury vapor lamp at intervals of fourteen days. Full healing occurred four to six weeks after irradiation. The area becomes paler and it is observed that, on pressure, the blood-capillaries will blanch more readily. A second and third application may be applied after an interval of two to three months, but this needs careful observation and control, as often the area will gradually continue to get paler and paler. Radioactive ointment has the advantage that it can be applied over the irregular contours of the face. Pigmentation rarely follows treatment and, if present, will slowly fade. This appears to be more prevalent during the summer months. A full erythema dose of ultraviolet rays, causing desquamation of the skin, will diminish the degree of pigmentation.

Telangiectases have followed only repeated and intensive doses of radioactive ointment, but are uncommon. Efforts have been made to reduce this by ultraviolet rays. Telangiectases can be destroyed by a molybdenum wire applied to a surgical diathermy electrode. It is necessary to use a local or general anesthetic. The area is mapped out carefully with the point of the electrode, and as the coagulating current passes slowly over the contours of the telangiectatic blood vessel this is coagulated and destroyed. Bleeding should be avoided. A dry scab is formed three to four days later, and healing can be accelerated by ultraviolet rays.

Factors in Planning and Designing a Convalescent Hospital. J. A. H. Brincker.

Proc. Roy. Soc. Med. **33**:369 (Feb.) 1939.

A convalescent hospital not only needs special planning and designing but, those natural advantages of the site which we look upon as health-giving.

Radiation whether it be natural sunlight or artificial, has tremendous biologic importance, while absence or want of sunlight breeds anemia, disease, and ultimately death.

Sunlight and radiation are important in promoting health. Radiation, whether it consists of rays of long wavelength such as are used in diathermy, of short waves (infra-red), of the rays of the visible

spectrum, or of near ultraviolet rays, has its useful part in the life of man. The human skin, through its complex capillary blood and nervous systems regulates the amount of blood and of hemoglobin on the surface exposed to radiation.

Winter, when solar radiation is at its minimum, is the time when droplet infections are most prevalent. It is the season for respiratory diseases of all kinds, for septic infections and for deficiency diseases. Solar or artificial radiation, therefore, is necessary not only to maintain health, but also to enable the human mechanism to function at its highest efficiency.

Sedimentation Speed of Erythrocytes After Intensive and Unaccustomed Physical Work. H. Deist.

Klin. Wchnschr. **17**:1607 (Nov. 12) 1938.

Deist made studies on 260 soldiers who had had sedentary occupations before their entry into military service and had not practiced athletics or sports. Thus these men were subject to considerable exertion in the change from their former mode of life. It is known that in the higher age groups the sedimentation speed is somewhat accelerated, but since the ages of these soldiers varied between 23 and 37 the author thinks that the age factor can be disregarded. The sedimentation speed of the men was tested during the first week of the service, four or five weeks after that, and again during the seventh week. The blood was withdrawn between 7 and 8 o'clock in the morning, before breakfast. The sedimentation speed was determined according to the original Westergren method. Of the 260 men, 220 (84.6 per cent) showed a normal sedimentation speed in all three tests. The others had an increased sedimentation speed in all three, in two or in only one of the tests. In some of these the deviation from the normal sedimentation values could be explained by intercurrent diseases such as febrile catarrhs of the upper respiratory tract, lymphangitis, extravasations or effusions. In two of the soldiers in whom all three tests showed an increase in the sedimentation speed neither a thorough examination nor the anamnesis revealed anything that would explain the increased sedimentation speed. In twelve men in whom only the second sedimentation test showed an increase no explanation could be found for the temporary acceleration and it is possible that the unaccustomed physical exertion might be a factor. The same might also be true in the aforementioned two cases. However, even if the physical exertion should be the causal factor of the increased sedimentation speed in fourteen of 260 cases, in view of so small a proportion it cannot be said that physical exertion regularly influences the sedimentation speed. Consequently the author thinks that a negative answer must be given to the question regarding the influence of physical exertion on the sedimentation speed. — [J. A. M. A. **112**:189 (Jan. 14) 1939.]

The Classification and Treatment of Obesity. J. K. Fancher.

J. M. A. Georgia **28**:7 (Jan.) 1939.

The largest group of obesities is the mixed types. This constitutes both exogenous and endogenous characteristics. Very few patients do well without dietary restriction. A combination of the proper hormonal therapy with a well worked-out diet brings about the best results. The diet used is based on the ideal and not the actual weight of the patient. The value of such a diet is that, although the patient will reduce while on it, he will never fall below his ideal weight, and in fact will only approach it. When a patient has reduced steadily to a point roughly approximating the calculated weight and then stops, no further reduction should be attempted, accepting the stopping point as the ideal weight for that individual. A true glandular obesity does not respond to a moderate reduction diet with weight loss.

The problem of selected and well regulated exercises is of great importance. Walking, golf, calisthenics, gymnasium exercises under proper supervision, massages, bicycle riding, horseback riding and swimming are encouragd according to the case. The individual physician, with his personal knowledge of the patient is best qualified to state just what and how much exercise each obese patient should take.

Artificial Fever Therapy. Leon Bromberg.

J. Missouri M. A. **36**:24 (Jan.) 1939.

In the past three years 290 patients have received 1,300 fever treatments. There have been no fatalities.

The cases found amenable to fever therapy are: (1) gonococcal infections, particularly the complicated cases which are resistant to more conservative treatment; (2) neurosyphilis and, (3) chorea. During the period mentioned above, Bromberg treated forty cases of gonococcal arthritis with the results that 80 per cent became completely symptom free; 17.5 per cent were improved, and 2.5 per cent did not respond. The clinical results in the majority of patients suffering from syphilis in various stages and manifestations were also very satisfactory. The eleven cases of chorea showed uniform improvement and relief of symptoms after fever therapy. One patient with advanced rheumatic heart disease withstood the treatment without mishap.

Four to five treatments have been found sufficient to effect clinical cure in the author's series. He believes that the optimum therapeutic temperature in this type of case is 105 F. rectally. The period of induction is usually shorter in active children than in adults, and care must be exercised to keep the temperature within the prescribed limits. After the first session of artificial fever therapy, Bromberg found that the children are entirely cooperative because their prompt clinical improvement is encouraging and

apparent even to them. The treatments are usually repeated at three day intervals; during each session the "effective fever" is maintained for four hours.

Role of Rehabilitation in American Sanatoria. Holland Hudson.

Hospitals **13**:79 (Feb.) 1939.

The question is often raised: What does rehabilitation cost? According to Hudson, rehabilitation is an individual problem and should be answered in terms which can be applied to one's own hospitals. In the city of Cincinnati, for instance, the total operating cost to the county of a department which included social service, occupational therapy, barbers, shoe repair, clothesroom service, entertainment, and rehabilitation was still less than one per cent of the hospital budget. That department has been considerably reduced recently to meet a crisis in bounty finances and now operates at a cost of less than five cents a day to the county per patient served by the rehabilitation program. At the peak of its cost, rehabilitation cost Hamilton County less than 10 cents a day per patient served. Or, if one prefers to figure costs on total beds, it cost the County less than three cents a day per adult bed. Federal funds are now matching the County's expenditure about two for one, so that, if the County took over the entire present program, it would cost the taxpayers slightly less than nine cents a day per adult bed. There are five hundred adult beds in Hamilton County Tuberculosis Sanatorium and the entire cost of operation must come from the tax funds.

On the matter of costs, the author advises that rehabilitation can be had only at some expense but can be purchased cheaply. For instance, there is an effective form of treatment for tuberculosis which is cheap. Superintendents who have had a chance to compare the services of lay workers selected because they were cheap with those of really professional calibre, know which worker costs the taxpayer the most in the long run. Accordingly, there is no worse investment in the treatment of tuberculosis than untrained social workers, untrained occupational therapists, or unequipped rehabilitation workers, for the return on the investment in practical results lacks medical or social values. Brains are not a cheap commodity but they may be a good investment.

Hypophysial Diabetes: Action of Fever. H. Zondek, and A. Kaatz.

Presse Medicale (Paris) **46**:1835 (Dec. 14) 1938.

Zondek and Kaatz describe two cases of hypophysial diabetes. The first patient was a woman aged 32 who presented hypophysial symptoms (endocrine obesity, psychic depression and manifest diabetes with constant increase in weight). The second patient was a man aged 30 who had a hypophysial tumor and symptoms of hypophysial dissociation (nanism, acromicria, hypergenitalism, osteoporosis, delayed ossification of the growth cartilages and symptoms of hypothyroidism with mental and physical infantilism) complicated by latent diabetes. In both cases the diabetes was cured after an attack of fever, in the woman after an attack of angina and in the man after a fever that was provoked by the intravenous injection of antityphoid vaccine. In both cases the diabetes was of the hypophysial type; the fever must have inhibited a diabetogenic principle. Whereas fever produces ordinarily an aggravation of pancreatic diabetes, it can have the reverse effect in certain cases of hypophysial diabetes. The authors discuss the interglandular relations that are involved in the metabolism of carbohydrates. They are inclined to believe that the principle inhibited by the fever is not the diabetogenic hormone described by Houssay but rather that which acts through the medium of the adrenal cortex (according to the opinion of Long). The diabetes results in these cases in an exaggerated transformation of nonhydrocarbonaceous substances into carbohydrates in accordance with von Noorden's theory of diabetes, but it is possible that outside of this factor there are still others that intervene; factors which inhibit either the fixation of glycogen or the oxidation of sugar. Thus the modern ideas of the nature of diabetes approach more and more the conception that it represents a complex disturbance of the interglandular regulation, as is the case in other endocrine disorders, exophthalmic goiter for example. — [J. A. M. A. **112**:482 (Feb. 4) 1939.]

Progress in Ophthalmology. Samuel J. Meyer.

Illinois M. J. **75**:514 (June) 1939.

Probably the most outstanding achievement in ophthalmology during the past fifteen years has been the operative treatment for retinal detachment. Prior to 1929, the usual so-called conservative methods, consisting of bedrest, bloodletting, and subconjunctival injections of irritant solutions, probably did not result in better than a one or two per cent cure. The hopelessness of the prognosis was very discouraging.

We must thank Gonin of Lausanna for whatever improvement in therapy and ultimate prognosis has been made. In 1929 he reported his first series of 100 cases treated by his thermocautery method. He reported better than 33 per cent cures, and made us "tear" or "hole" conscious. He was able to localize holes or tears of the retina in better than 90 per cent of the cases examined and correlated the presence of a retinal hole with the etiology of retinal detachment.

In 1931 Larrson announced his development of the use of the diathermy current, using a ball electrode and surface coagulation. By this method one did not have to localize the hole so carefully, as the coagulating current could be safely applied over large areas of the detached retina without appreciable danger to the eyeball.

During the past ten years the author has evolved his present technic, which consists of accurate hole

localization, the use of the diathermy current for flat and perforating coagulation and catholysis. This technic facilitates localization of tears in a much greater number of cases, scaling of the tear present. A favorable result occurs in 33-75 per cent of the cases.

An Interchangeable Ball Tip Electrode for Diathermization of Vesical Tumors With the McCarthy No. 24 Electrome. Samuel T. Kramer.

J. Urol. **41**:829 (May) 1939.

The McCarthy electrotome has been used with great satisfaction, ease and precision for practically all the pathologic conditions in the bladder and vesical neck in which electrocoagulation is indicated.

In applying this method the apparent advantage of the McCarthy ball electrode for the production of slower and deeper coagulation suggested such a modification of the punctate electrode. Ball tips of varying size can be attached to the threaded tip of this new resectoscopic electrode. Thus a greater variety of neoplasms can be treated with this ideal instrument and the therapeutic test of diathermization can be applied more successfully to potentially malignant neoplasms with ball electrodes of sizes adapted for the various types of growth.

Value of Fever Therapy in Sulfanilamide-Resistant Gonorrhea. C. A. Owens; W. D. Wright, and M. D. Lewis.

J. Urol. **40**:847 (Dec.) 1938.

Owens and his co-workers present the results of artificially induced fever in eleven patients with gonorrhea who were intolerant to sulfanilamide. Each patient had received sulfanilamide therapy in fairly adequate dosage. Some had had two or three courses of this medication. Each patient had persistently positive smears for gonococci following the sulfanilamide therapy. Several had developed epididymitis or arthritis during the course of treatment. Each patient entered the hospital and received a preliminary three hours in the Kettering hypertherm during which time his temperature was raised from 103 to 104 F. This preliminary heating was given largely to accustom the patients to lying in the warm cabinet and to quiet their fears. The following day each patient received ten hours of artificial fever at from 106 to 107 F. He then remained in the hospital one or two days after this treatment, during which time check-up examinations were made. He was then dismissed but remained under observation for repeated check-up examinations. Ten of the eleven patients were cured (entirely free of all clinical symptoms and signs and repeated examinations by smears have failed to show gonococci after periods of normal behavior as regards alcoholic and sexual stimulation) by the single fever treatment. Although the remaining patient was not cured by the fever session, apparently the organisms were made more susceptible as a second course of sulfanilamide succeeded in curing him. — [J. A. M. A. **112**:475 (Feb. 4) 1939.]

Iontophoresis in Arthritis and Vascular Disease. O. B. Kiel.

Texa State J. Med. **34**:517 (Dec.) 1938.

Of 151 individual cases treated with acetyl-beta-methylcholine chloride iontophoresis, 78 were rheumatoid arthritis, 23 osteo-arthritis and 60 an assortment of vascular diseases. Forty-three of the 78 patients with rheumatoid arthritis were "completely relieved" (the involved joints function in a normal manner), 26 were "partially relieved," and 9 obtained no relief. Any patient reported as partially relieved had a reduction in the swelling of the joints, some relief of the pain, an increase in endurance, lessening of fatigability and a feeling that considerable good had been accomplished. Of the 23 patients with osteo-arthritis four were completely relieved, ten were partially relieved and nine experienced no relief. In the miscellaneous group three of eight patients with thrombo-angiitis obliterans were completely relieved or restored to a normal state of health. Of six patients with gonorrheal arthritis five were completely relieved. These cases in many respects simulate rheumatoid arthritis. Specific therapy was a necessary adjunct to the treatment of these cases. The remainder of the cases are classified as Raynaud's disease, neuritis, bursitis, myositis and traumatic arthritis. Of the total number of patients in this group 35 were completely relieved, 14 were partially relieved and 17 received no relief. In the rheumatoid group a total of 1,824 treatments was given, representing an average of twenty-three treatments for each patient. The osteo-arthritic patients received a total of 533 treatments, averaging twenty-three treatments per patient. In the miscellaneous cases 1,525 treatments were given, with an average of about twenty-five treatments each. By far the greater number of treatments was given to those affected with thrombo-angiitis obliterans. The least number of treatments with the most encouraging results was given the group of patients with ulcers of the extremities. No patient with a clearcut, uncomplicated ulcer received more than eighteen treatments. — [J. A. M. A. **112**:368 (Jan. 28) 1939.]

Delayed Photosensitization of the Skin Due to Sulfanilamide. A Case Report. William Vernon Wax.

New York State J. Med. **39**:723 (April 1) 1939.

Photosensitization of the skin due to sulfanilamide is a relatively rare occurrence, but should be carefully guarded against because of the increased use of this drug. A case was seen with *delayed* photosensitivity of the skin brought on many months after therapy was started and discontinued, due to exposure to sunlight and artificial sunlight.

The photosensitized areas are large deep dark brown patches, apparently fixed in the skin, with a sharp line of demarcation, occurring after withdrawal of the sulfanilamide. The areas may break down and form troublesome ulcers. Patients taking sulfanilamide should be strictly warned against exposing themselves to sunlight or artificial sunlight during or after the administration of sulfanilamide.

PRELIMINARY PROGRAM

INSTRUCTION SEMINAR — PHYSICAL THERAPY
18TH ANNUAL SCIENTIFIC SESSION

American Congress of Physical Therapy

INSTRUCTION SEMINAR — AUGUST 30, 31, SEPTEMBER 1, 2, 1939
ANNUAL SESSION — SEPTEMBER 5, 6, 7, 8, 1939

HOTEL PENNSYLVANIA NEW YORK

SCHEDULE OF EVENTS

AUGUST 30, 31, SEPTEMBER 1 and 2

INSTRUCTION SEMINAR

9 to 11 A. M. **Hospital Clinics.**
2 to 4 P. M. **Didactic Lectures.**
Hotel Pennsylvania — Salle Moderne (Roof Garden Floor)
4 to 5 P. M. **Group Conferences.**
Hotel Pennsylvania
(Rooms to be announced)

SEPTEMBER 3 and 4 (Visit the World's Fair)

SEPTEMBER 4* (after 2 P. M.) Registration

12 Noon **Luncheon — Advisory Board and Board of Registry — American Registry Physical Therapy Technicians — Parlor A.**
6 P. M. **Executive Dinner — Parlors A and B.**

*Committees are urged to hold their meetings sometime on September 4, so as to be prepared to bring in their reports either at the Executive Session on September 4, after the Executive Dinner, or at the general business meeting, Tuesday, September 5, 3 P. M.

Inspection of Technical and Scientific Exhibits (after 2 P. M.)

9 A. M. to 5 P. M. **Technicians' Examination.**
Parlor C (Ball Room Floor)

SEPTEMBER 5 (Tuesday)

8 to 10 A. M. **Registration and Inspection of Exhibits.**
10:15 to 1. **GENERAL SCIENTIFIC SESSION.** — Banquet Room.
1 to 3. **Recess — Luncheon — Inspection of Exhibits.**
3 to 5. **ANNUAL BUSINESS MEETING** — Banquet Room.
5 to 7:30. **Dinner and Inspection of Exhibits.**
7:45 P. M. **FORMAL OPENING OF 18TH ANNUAL SESSION.** — Banquet Room.
10 P. M. **SMOKER AND FELLOWSHIP GATHERING.**

SEPTEMBER 6 (Wednesday)

8 to 9 A. M. **Registration and Inspection of Exhibits.**
9 to 1. **GENERAL SCIENTIFIC SESSION** — Banquet Room.
9 to 1. SECTION ON EYE, EAR NOSE AND THROAT — Southeastern Ball Room.
1 P. M. to 6. **Recess — Luncheon — Inspection of Exhibits.**
6:30 P. M. **ANNUAL CONGRESS DINNER** — Banquet Room.

SEPTEMBER 7 (Thursday)

8 to 9 A. M. **Registration and Inspection of Exhibits.**
9 to 1. **GENERAL SCIENTIFIC SESSION** — Banquet Room.
9 to 1. SECTION ON EYE, EAR, NOSE AND THROAT — Southeastern Ball Room.
1 P. M. to 6. **Recess — Luncheon — Inspection of Exhibits.**
8 P. M. **World's Fair Day — Professional Building Fair Grounds.**

SEPTEMBER 8 (Friday)

8 to 9 A. M. **Registration and Inspection of Exhibits.**
9 to 12. **GENERAL SCIENTIFIC SESSION.** — Banquet Room.
12 to 2. **Recess — Luncheon — Inspection of Exhibits.**
2 to 4. **GENERAL SCIENTIFIC SESSION.** — Banquet Room.

Note: The technical (commercial) exhibits will close each day at 6 P. M., except Tuesday evening, when they will close promptly at 7:30. Exhibitors are asked to adhere to the ruling. Exhibits may be dismantled on Friday, September 8, after 3 P. M.

BUSINESS SESSION

TUESDAY, September 5, 3 P. M.

BANQUET ROOM

I. **Call to Order by the President, Frank H. Krusen, M.D.**
II. **Reading of Minutes**
III. **Reports of Committees**
IV. **Reports of:**
(1) Executive Director
(2) Editor
(3) Treasurer
(4) Registrar (American Registry of Physical Therapy Technicians)
V. **Old Business**
VI. **New Applications for Membership**
VII. **New Business**
VIII. **Election of Officers**
IX. **Good and Welfare**
Report of Committee on Radio Interference.
JOHN S. COULTER, M.D., Chicago.
Report on Spa Situation.
WALTER S. McCLELLAN, M.D. Saratoga Springs, N. Y.
Adjournment.

LECTURERS AND CLINICIANS FOR INSTRUCTION SEMINAR

●

H. J. BEHREND, M.D., Associate Physical Therapist, Hospital for Joint Diseases, N w York;

WILLIAM BIERMAN, M.D., Assistant Clinical Professor of Therapeutics, New York University College of Medicine; Associate in Medicine, Columbia University, New York;

HOWARD A. CARTER, B.S., in M.E., Secretary, Council on Physical Therapy, American Medical Association, Chicago;

ANTHONY C. CIPOLLARO, M.D., Associate Skin and Cancer Hospital, New York Post-Graduate Medical School, Columbia University; Member of Council on Physical Therapy, American Medical Association, New York;

JOHN S. COULTER, M.D., Associate Professor Physical Therapy, Northwestern University Medical School; Member of Council on Physical Therapy, American Medical Association, Chicago;

JOHN D. CURRENCE, M.D., Assistant Professor Clinical Medicine, New York Post-Graduate Medical School and Hospital, Columbia University, New York;

FRANK H. EWERHARDT, M.D., Professor of Physical Education; Assistant Professor Physical Therapeutics, Washington University School of Medicine, St. Louis, Mo.;

KRISTIAN G. HANSSON, M.D., Instructor Clinical Surgery (Orthopedics) Cornell University School of Medicine, New York;

KARL HARPUDER, M.D., Assistant Clinical Professor of Medicine, Columbia University, New York;

EDWARD F. HARTUNG, M.D., Assistant Professor of Medicine, New York Post-Graduate Medical School and Hospital, Columbia University, New York;

DISRAELI KOBAK, M.D., Assistant Clinical Professor Medicine (Physical Therapy) Rush Medical College of University of Chicago, Chicago;

JOSEPH KOVACS, M.D., Assistant Attending Physician, New York Post-Graduate Medical School, Columbia University, New York;

RICHARD KOVACS, M.D., Clinical Professor and Director of Physical Therapy, New York Polyclinic Medical School and Hospital, New York;

FRANK H. KRUSEN, M.D., Head of Section on Physical Therapy, Mayo Clinic; Associate Professor Physical Medicine, The Mayo Foundation, University of Minnesota; President, American Congress of Physical Therapy, Rochester, Minn.;

ALBERT A. MARTUCCI, M.D., Director Department Physical Therapy, Abington Memorial Hospital, and Protestant Episcopal Hospital of Philadelphia, Abington, Penn.;

WALTER S. McCLELLAN, M.D., Associate Professor of Medicine, Albany Medical College; Medical Director, Saratoga Spa, Saratoga Springs, N. Y.;

MADGE C. L. McGUINNESS, M.D., Director Physical Therapy, Lenox Hill and Misericordia Hospitals, New York;

CHARLES O. MOLANDER, B.S., M.D., Associate Physical Therapy, Northwestern University Medical School, Chicago;

W. WALLACE MORRISON, M.D., Clinical Professor and Chief of Clinic, Department of Otolaryngology, New York Polyclinic Medical School and Hospital, New York;

KENNETH PHILLIPS, M.D., Director Physical Therapy Center; Chief of Medical Staff, James M. Jackson Memorial Hospital, Miami, Fla.;

NATHAN H. POLMER, M.D., Professor Physical Therapy, Graduate School of Medicine, Louisiana State University Medical Center, New Orleans;

WILLIAM H. SCHMIDT, M.D., Assistant Professor of Physical Therapy, Jefferson Medical College, Philadelphia;

LEWIS J. G. SILVERS, M.D., Otolaryngologist, Ocean Hill Memorial Hospital, Brooklyn, New York;

WILLIAM BENHAM SNOW, M.D., Associate, Medicine, College of Physicians and Surgeons, Columbia University, New York;

NORMAN E. TITUS, M.D., Consultant in Physical Therapy to Beekman Street Hospital, New York; Medical Center, Jersey City, N. J., etc., New York;

BROR S. TROEDSSON, M.D., Director of Physical Therapy, Orange Memorial Hospital, Orange, N. J.; Assistant Director of Physical Therapy, New York Hospital, Cornell Medical Center, New York;

BENJAMIN ULANSKI, M.D., Chief of Physical Therapy Department Northern Liberties Hospital; and National Stomach Hospital, Philadelphia;

JEROME WEISS, M.D., Attending Physical Therapist, Hospital for Joint Diseases, New York; Brooklyn, N. Y.;

WALTER J. ZEITER, M.D., Director Physical Therapy, Cleveland Clinic, Cleveland.

INSTRUCTION SEMINAR PRECEDING 18th ANNUAL CONVENTION

HOSPITAL CLINICS *

9 to 11 A.M. Daily

WEDNESDAY, August 30

Lenox Hill Hospital, 111 E. 76th Street (near Park Ave.).
DR. MADGE C. L. McGUINNESS — General Physical Therapy Clinic.
Polyclinic Hospital, 335 West 50th Street (near 8th Ave.).
DR. RICHARD KOVACS — Instruction models of apparatus, Traumatism, Arthritis, Gynecologic, Proctologic and Nose and Throat.

THURSDAY, August 31

Mount Sinai Hospital, 100th Street and Fifth Avenue.
DR. WILLIAM BIERMAN — Fever Therapy.
Hospital for Joint Diseases, 123rd Street and Madison Ave.
DR. JEROME WEISS — Posture Clinic, Muscle Reeducation, Massage and Exercise.

FRIDAY, September 1

Post-Graduate Hospital, 20th Street and Second Avenue.
DR. JOHN D. CURRENCE — Rheumatic Cases, Peripheral Vascular Disease.
New York Hospital, (Cornell Medical Center) 68th Street and York Avenue.
DR. K. G. HANSSON — Poliomyelitis, Low Back Affections, Fractures.

SATURDAY, September 2

Neurologic Institute, (Columbia Medical Center) 168th Street and Broadway.
DR. WM. B. SNOW — Fever Therapy in Neurologic Cases.
Montefiore Hospital, Bainbridge Avenue and Gun Hill Road.
DR. KARL HARPUDER — Peripheral Vascular Disease, Arthritis.

* Please designate on your application blank clinic of your choice for each day, otherwise you will be assigned.

DIDACTIC LECTURES (Hotel Pennsylvania)

WEDNESDAY, August 30

1 to 2 — Fundamental Principles of Medical Electricity — R. KOVACS.
2 to 3 — High Frequency Currents, Physics, Apparatus, Physiologic Effects — BIERMAN.
3 to 4 — Ultraviolet — Physics, Apparatus, Physiologic Effects — TITUS.

THURSDAY, August 31

1 to 2 — Exercise and Massage — Indications, Technic, Effects — HANSSON.
2 to 3 — Iontophoresis — HARPUDER.
3 to 4 — Physical Therapy in Otolaryngology — MORRISON.

FRIDAY, September 1

1 to 2 — Physical Therapy in Gynecology — McGUINNESS.
2 to 3 — Physical Therapy in Arthritis — SCHMIDT.
3 to 4 — Physical Therapy in Orthopedics — EWERHARDT.

SATURDAY, September 2

1 to 2 — Physical Therapy in Fractures — COULTER.
2 to 3 — Short Wave Diathermy — KOBAK.
3 to 4 — Dangers and Restrictions of Physical Therapy — KRUSEN.

GROUP CONFERENCES (Hotel Pennsylvania) *

WEDNESDAY, August 30

4 to 5 — (1) Low Frequency Currents — WEISS.
4 to 5 — (2) Short Wave Diathermy — TROEDSSON.
4 to 5 — (3) Ultraviolet — MARTUCCI.
4 to 5 — (4) Massage and Exercise — BEHREND.

THURSDAY, August 31

4 to 5 — (5) Physics in Physical Therapy — CARTER.
4 to 5 — (6) Postural Defects in Arthritis — HARTUNG.
4 to 5 — (7) Physical Therapy in Arthritis — ZEITER.
4 to 5 — (8) Infantile Paralysis — MOLANDER.

FRIDAY, September 1

4 to 5 — (9) Hydrotherapy — McCLELLAN.
4 to 5 — (10) Physical Therapy in Otolaryngology — SILVERS.
4 to 5 — (11) Physical Therapy in Arthritis — CURRENCE.
4 to 5 — (12) Industrial Physical Therapy — ULANSKI.

SATURDAY, September 2

4 to 5 — (13) Iontophoresis — J. KOVACS.
4 to 5 — (14) Fever Therapy — K. PHILLIPS.
4 to 5 — (15) Physical Therapy in Dermatology — CIPOLLARO.
4 to 5 — (16) Physical Therapy in Fractures — POLMER.

* Registrant must designate on application blank choice of conference for each day.

The course is intended primarily for physicians, but a limited number of technicians, properly vouched for, will be admitted. The fee will be $25.00; for members of the Congress in good standing, $20.00. Class limited to 100. **REGISTRATION BY APPLICATION ONLY.**

GENERAL SCIENTIFIC SESSION

TUESDAY, September 5, 10:15 A. M.

BANQUET ROOM

OFFICERS OF THE SECTION

Chairman — FRANK H. KRUSEN, M.D., Rochester, Minn.
Secretary — RICHARD KOVÁCS, M.D., New York.

101. New Means of Experimental Physico-Diagnosis.
PAUL LIEBESNY, M.D., Director of Physical Therapy, Bronx Hospital. NEW YORK.
Discussion: Disraeli Kobak, M.D., Chicago; William Bierman, M.D., New York; K. Harpuder, M.D., New York.

102. Postural Reflexes.
O. LEONARD HUDDLESTON, M.D., Assistant Professor of Physiology and Pharmacology, University of Colorado School of Medicine. DENVER.
Discussion: Royal Storrs Haynes, M.D., New York; F. H. Ewerhardt, M.D., St. Louis; John P. Stump, M.D., New York; Robert L. Bennett, Jr., M.D., Rochester, Minn.

103. Hysterosalpingography: A Deciding Factor in the Management of Female Pelvic Pathology.
GEORGE LYFORD, M.D., Clinician in Gynecologic Division of O. P. D., Cincinnati General Hospital; Staff, C. R. Holmes Memorial Hospital,
and
B. BILLMAN, M.D., Director of Physical Therapy, Union Bethel Clinic and Longview Hospital.
CINCINNATI.
Discussion: Mortimer N. Hyams, M.D., New York; Madge C. L. McGuinness, M.D., New York; Arthur Stein, M.D., New York.

104. Physical Therapy in Various Manifestations of Brucellosis (Undulant Fever).
HAROLD J. HARRIS, M.D., Attending Physician, Elizabethtown Community Hospital, etc.
WESTPORT (ESSEX COUNTY) N. Y.
Discussion: Kenneth Phillips, M.D., Miami, Fla.; Walter J. Zeiter, M.D., Cleveland, O.

105. Synergism of Drugs and Visible and Ultraviolet Rays Upon Streptococci.
LUDWIG PINCUSSEN, Ph.D., M.D., Research Associate, Department of Physiology, University of Illinois College of Medicine. CHICAGO;
and
ALEXANDER J. NEDZEL, M.D., Associate Professor of Pathology and Bacteriology, University of Illinois College of Medicine. CHICAGO.
Discussion: Fred B. Moor, M.D., Los Angeles, Calif.; O. Leonard Huddleston, M.D., Denver, Colo.; M. J. Dorcas, Ph.D., Cleveland, O.

EVENING SESSION

TUESDAY, September 5, 7:45 P.M.

BANQUET ROOM

OFFICERS OF THE SECTION

Chairman — FRANK H. KRUSEN, M.D., Rochester, Minn.
Secretary — RICHARD KOVÁCS, M.D., New York.

FORMAL OPENING OF 18th ANNUAL SESSION

Invocation: The Reverend Samuel Trexler, *President,* United Lutheran Synod, New York.
Addresses of Welcome: Terry M. Townsend, M.D., *President,* Medical Society, State of New York.
Farel Jouard, M.D., *President,* New York Physical Therapy Society.
Benjamin Ulanski, M.D., *President,* Pennsylvania Physical Therapy Association.
Induction of President-Elect: William H. Schmidt, M.D. PHILADELPHIA.
Address: The Future Development of Physical Therapy.

An Evaluation of Methods and Mechanical Devices for Producing Increased Blood Flow in the Extremities.
BAYARD T. HORTON, M.D., Consultant in Medicine, Mayo Clinic; Associate Professor of Medicine, The Mayo Foundation, University of Minnesota,
and
FRANK H. KRUSEN, M.D., Head of Section on Physical Therapy, Mayo Clinic; Associate Professor of Physical Medicine, The Mayo Foundation, University of Minnesota. ROCHESTER, MINN.
Discussion: Karl Harpuder, M.D., New York; William Kountz, M.D., St. Louis; Paul Merrell, M.D., Indianapolis; Samuel Silbert, M.D., New York; Joseph Kovács, M.D., New York.

Radio Interference by Electric Apparatus.
HORATIO BURT WILLIAMS, M.D., Dalton Professor of Physiology, College of Physicians and Surgeons, Columbia University. NEW YORK.
Discussion: Howard Carter, B.S., in M.E., Chicago.

Title to be Announced.
RUSSELL L. CECIL, M.D., Professor of Clinical Medicine, Cornell University Medical School. NEW YORK.

GENERAL SCIENTIFIC SESSION

WEDNESDAY, September 6, 9 A. M.

BANQUET ROOM

OFFICERS OF THE SECTION

Chairman — RICHARD KOVÁCS, M.D., New York.
Secretary — MILAND E. KNAPP, M.D., Minneapolis.

201. Spa Therapy in Rheumatic Diseases.
EUCLID M. SMITH, M.D., Assistant Professor of Medicine, University of Arkansas, School of Medicine,
and
CHARLES H. LUTTERLOH, M.D., F.A.C.P., Attending Physician, Leo N. Levi Memorial Hospital, and Charles Steinberg Clinic. HOT SPRINGS, ARK.
Discussion: Walter S. McClellan, M.D., Saratoga Springs, N. Y.; Charles I. Singer, M.D., Long Beach, N. Y.; John Carroll, M.D., New York.

202. Backache: Common Causes and Treatment with Special Reference to Physical Therapy.
HENRY W. MEYERDING, M.D., Professor of Orthopedic Surgery, Mayo Foundation, Graduate School of Medicine, University of Minnesota and Mayo Clinic,
and
GEORGE A. POLLOCK, M.D., Fellow in Orthopedic Surgery, The Mayo Foundation.
ROCHESTER, MINN.
Discussion: Edward F. Hartung, M.D., New York; F. H. Ewerhardt, M.D., St. Louis, Mo.; C. O. Molander, M.D., Chicago; R. Lyman Sexton, M.D., Washington, D. C.

203. Ultraviolet Radiation Dangers.
ANTHONY C. CIPOLLARO, M.D., Associate Skin and Cancer Hospital, New York Post-Graduate Medical School, Columbia University; Member, Council on Physical Therapy, American Medical Association. NEW YORK.
Discussion: Miland E. Knapp, M.D., Minneapolis; Wm. T. Anderson, Jr., Ph.D., Newark, N. J.; G. J. P. Barger, M.D., Washington, D.C.; G. E. Crosley, M.D., Milton, Wis.

204. Electrical Stimulation of Denervated Muscle: Its Therapeutic Value.
FRED B. MOOR, M.D., Professor of Pharmacology and Therapeutics, School of Medicine, College of Medical Evangelists, Loma Linda, Calif. LOS ANGELES;
CLARENCE W. DAIL, M.D., Instructor of Pharmacology and Therapeutics, College of Medical Evangelists, Loma Linda, Calif. LOMA LINDA, CALIF.;
and
KENNETH KELLOGG, M.D., Instructor of Physiology, College of Medical Evangelists, Loma Linda, Calif. LOMA LINDA, CALIF.
Discussion: Sidney Licht, M.D., New York; N. H. Polmer, M.D., New Orleans; B. Billman, M.D., Cincinnati.

205. Thermostatically Controlled Intravaginal Air Therapy in Pelvic Inflammation. Preliminary Report.
LOUIS B. NEWMAN, M.D., Associate in Physical Therapy, Cook County Hospital,
and
FREDERICK H. FALLS, M.D., Professor of Obstetrics and Gynecology and Head of Department, University of Illinois College of Medicine. CHICAGO.
Discussion: Disraeli Kobak, M.D., Chicago; Madge C. L. McGuinness, M.D., New York; George Lyford, M.D., Cincinnati.

206. A Method of Raising Venous Pressure in Surgical and Traumatic Shock.
GEORGE G. ORNSTEIN, M.D., Associate Clinical Professor of Medicine, New York Post-Graduate Medical School, Columbia University; Medical Director, Tuberculosis Services, Sea View and Metropolitan Hospitals,
SIDNEY LICHT, M.D., Adjunct Physical Therapist, Mount Sinai Hospital; Assistant in Therapeutics, New York University College of Medicine;
and
MYRON HERMAN, M.D., Resident Physician, Sea View Hospital. STATEN ISLAND, N. Y.
Discussion: Franz Groedel, M.D., New York; Kenneth Phillips, M.D., Miami, Fla.

SECTION ON
EYE, EAR, NOSE AND THROAT

WEDNESDAY, September 6, 9 A. M.

SOUTHEASTERN BALL ROOM

OFFICERS OF THE SECTION

Chairman — Oscar B. Nugent, M.D., Chicago.
Secretary — Farel Jouard, M.D., New York.

351. Conservative Method of Treatment of Trigeminal Neuralgia.
BENJAMIN ULANSKI, M.D., Chief, Physical Therapy Department, Northern Liberties and National Stomach Hospitals. PHILADELPHIA.

352. Physical Therapeutic Management of Facial Paralysis.
M. K. NEWMAN, M.D., Attending in Physical Therapy, North End Clinic and Grace Hospital;
J. M. BERRIS, M.D., Associate Attending Physician, Grace Hospital; Assistant Instructor in Internal Medicine, Wayne University College of Medicine;
and
S. S. BOHN, M.D., Instructor, Neurology and Psychiatry, Wayne University College of Medicine. DETROIT.

Discussion of foregoing papers: William H. Schmidt, M.D., Philadelphia; Norman E. Titus, M.D., New York; Disraeli Kobak, M.D., Chicago.

353. Physical Procedures in Upper Respiratory Affections. (New Experiments, Slides, Instruments, etc.)
JOHN KERNAN, M.D., Professor of Otolaryngology, College of Physicians and Surgeons, Columbia University. NEW YORK.

Discussion: J. A. Haiman, M.D., New York; M. C. Myerson, M.D., New York.

354. Roentgen Therapy in Otorhinology.
MATTHEW ERSNER, M.D., Professor of Otology, School of Medicine, Temple University; Associate Professor of Otology, Graduate School of Medicine, University of Pennsylvania. PHILADELPHIA.

Discussion: Raphael Schillinger, M.D., Brooklyn; G. Allen Robinson, M.D., New York; Maurice Lenz, M.D., New York.

355. Status of Short Wave Diathermy in the Treatment of Nasal Sinus Disease.
FREDERICK L. WAHRER, M.D., Staff, Evangelical Deaconess, and Mercy Hospitals, Marshalltown; Otolaryngologist to Iowa Training School for Boys, Eldora, Ia. MARSHALLTOWN, IA.

356. Conservative Treatment of Sinus Disease: An Apparatus Affording Physiologic Rest to the Respiratory Tract.
LEWIS J. SILVERS, M.D., Otolaryngologist, Ocean Hill Memorial Hospital, Brooklyn. NEW YORK.

Discussion of foregoing papers: Anthony G. Sacco, M.D., Union City, N. J.; W. H. Guillium, M.D., Asbury Park, N. J.; Farel Jouard, M.D., New York.

GENERAL SCIENTIFIC SESSION

THURSDAY, September 7, 9 A. M.

BANQUET ROOM

OFFICERS OF THE SECTION

Chairman — William Bierman, M.D., New York.
Secretary — Albert A. Martucci, M.D., Philadelphia.

SYMPOSIUM ON FEVER THERAPY

301. Recent Developments Resulting from Fever Therapy Research.
MURRAY B. FERDERBER, M.D., Department of Industrial Hygiene, School of Medicine, University of Pittsburgh. PITTSBURGH.

302. Artificial Fever in Chronic Atrophic Arthritis.
WALTER M. SOLOMON, M.D., Department of Medicine, Western Reserve University, School of Medicine,
and
ROBERT M. STECHER, M.D., Senior Clinical Instructor, Department of Medicine, Western Reserve University, School of Medicine. CLEVELAND.

303. Autochemotherapy Reinforced with Artificial Fever in Rheumatic Disease.
WILLIAM K. ISHMAEL, M.D., Staff, Bone and Joint Hospital. OKLAHOMA CITY.

304. Fever Therapy in Syphilis and Gonococcic Infections.
H. WORLEY KENDELL, M.D., Assistant Director, Department of Fever Therapy Research, The Miami Valley Hospital. DAYTON, O.

305. Treatment of Gonorrhea by Artificial Fever Alone and by Fever in Combination with Sulfanilamide.
ELMER BELT, M.D., Associate Professor of Surgery and Urology, College of Medical Evangelists, Loma Linda, Calif.,
and
ALVIN FOLKENBERG, M.D., Associate, Belt Clinic. LOS ANGELES.

306. The Management of Dementia Paralytica by Combined Artificial Fever and Chemotherapy.
A. E. BENNETT, M.D., Assistant Professor of Neuropsychiatry, Director of Fever Therapy Research Department, University of Nebraska College of Medicine; Neuropsychiatrist-in-Chief, Bishop Clarkson Memorial Hospital, OMAHA;
JUUL NIELSON, M.D., Superintendent, Hastings State Hospital, Ingleside. INGLESIDE, NEBR.;
A. H. FECHNER, M.D., Superintendent, Lincoln State Hospital. LINCOLN, NEBR.;
and
PAUL T. CASH, M.D., Resident Physician, Neurological Institute. NEW YORK.

307. A Laboratory Technic for the Production of Fever.
EARL C. ELKINS, M.D., Consultant in Physical Medicine, Section on Physical Therapy, Mayo Clinic,
and
ROBERT L. BENNETT, Jr., M.D., Fellow in Physical Medicine, Section on Physical Therapy, Mayo Clinic. ROCHESTER, MINN.

Discussion of foregoing papers: Malcolm M. Cook, M.D., Minneapolis; Kenneth Phillips, M.D., Miami, Fla.; Norman E. Titus, M.D., New York; William H. Schmidt, M.D., Philadelphia; Ray Piaskoski, M.D., Milwaukee.

SECTION ON
EYE, EAR, NOSE AND THROAT

THURSDAY, September 7, 9 A. M.

SOUTHEASTERN BALL ROOM

OFFICERS OF THE SECTION

Chairman — FREDERICK L. WAHRER, M.D., Marshalltown, Ia.
Secretary — LEWIS J. SILVERS, M.D., New York.

451. Physical Therapy in Relation to Ophthalmology.

ALBERT L. BROWN, M.D., Assistant Professor of Ophthalmology, University of Cincinnati College of Medicine. CINCINNATI.

452. Short Wave Diathermy in the Treatment of Infectious Eye Diseases.

A. D. RUEDEMANN, M.D., Head of Department of Ophthalmology, Cleveland Clinic,
and
WALTER J. ZEITER, M.D., Director of Physical Therapy, Cleveland Clinic. CLEVELAND.

453. Iontophoresis in the Treatment of Certain Eye Conditions.

CARL B. SPUTH, M.D., Associate in Ophthalmology, Indiana University School of Medicine. INDIANAPOLIS.

Discussion of foregoing papers: Oscar B. Nugent, M.D., Chicago; Ramon Castroviejo, M.D., New York; Joseph I. Pascal, M.D., New York; Walter R. Loewe, M.D., New York.

454. Retinal Detachment.

ADOLPH POSNER, M.D., Assistant Surgeon, Herman Knapp Memorial Eye Hospital. NEW YORK.

455. Detachment of the Retina; End Results of Surgical Treatment.

HUGH S. McKEOWN, M.D., Instructor in Ophthalmology, College of Physicians and Surgeons, Columbia University. NEW YORK.

Discussion of foregoing papers: Luther C. Peter, M.D., Philadelphia; Oscar B. Nugent, M.D., Chicago.

456. Vasomotor Rhinitis, Asthma and Allied Conditions.

J. A. HAIMAN, M.D., Associate Attending, Ear, Nose and Throat, Hospital for Joint Diseases. NEW YORK.

Discussion: A. R. Hollender, M.D., Miami Beach, Fla.; Albert Moriconi, M.D., Trenton, N. J.

GENERAL SCIENTIFIC SESSION

FRIDAY, September 8, 9 A. M.

BANQUET ROOM

OFFICERS OF THE SECTION

Chairman — N. H. POLMER, M.D., New Orleans.
Secretary — MADGE C. L. MCGUINNESS, M.D., New York.

401. Modern Concepts of Prophylactic and Corrective Exercises.

JEROME WEISS, M.D., Attending Physical Therapist, Hospital for Joint Diseases,
and
HANS J. BEHREND, M.D., Associate Physical Therapist, Hospital for Joint Diseases. NEW YORK.

Discussion: F. H. Ewerhardt, M.D., St. Louis; Jesse T. Nicholson, M.D., Philadelphia; K. G. Hansson, M.D., New York; Jessie Wright, M.D., Pittsburgh, Pa.

402. Electrocoagulation of Aortic Aneurysms.

ARTHUR H. BLAKEMORE, M.D., Assistant Surgeon, Presbyterian Hospital, Vanderbilt Clinic. NEW YORK.

Discussion: Gustavus M. Blech, M.D., Chicago; Barry G. King, Ph.D., New York.

403. Chronaxie in Nerve Injuries. (Lantern Slides).

JOSEPH RESNIK, M.D., Physician-in-Chief for Physical Therapeutics, Boston City Hospital, BOSTON;
PAUL H. WILCOX, M.D., Assistant Physician, Metropolitan State Hospital, WALTHAM, MASS.;
and
REUBEN REITER, D. Sc., Director of Technical Research, New York Institute for the Education of the Blind. NEW YORK.

Discussion: B. S. Troedsson, M.D., New York; Albert A. Martucci, M.D., Philadelphia; Amour Liber, M.D., New York.

404. Further Studies on Dosage and Technic in Short Wave Diathermy.

DISRAELI KOBAK, M.D., Assistant Clinical Professor of Medicine (Physical Therapy) Rush Medical College of the University of Chicago,
and
EUGEN MITTELMANN, Eng. D., Ph.D. CHICAGO.

405. Observations on Short Wave Heat.

ALBERT BACHEM, Ph.D., Professor of Biophysics, University of Illinois College of Medicine. CHICAGO.

Discussion of foregoing papers: Myron Schwarzschild, Ph.D., New York; Charles Sheard, Ph.D., Rochester, Minn.; Howard Carter, B.S. (M.E.), Chicago; D. E. Richardson, B.S. (E.E.), M.S., Chicago; H. J. Holmquest, B.S. (M.E.), Chicago.

GENERAL SCIENTIFIC SESSION

FRIDAY, September 8, 2 P. M.

BANQUET ROOM

OFFICERS OF THE SECTION

Chairman — WILLIAM H. SCHMIDT, M.D., Philadelphia.
Secretary — JAMES W. WILTSIE, M.D., Binghamton, N. Y.

SYMPOSIUM ON FRACTURES

407. Fractures.

ELDRIDGE L. ELIASON, M.D., John Rhea Barton Professor of Surgery, University of Pennsylvania, School of Medicine. PHILADELPHIA.

408. After-Care of Fractures with Special Reference to Delayed Union and Sudeck's Atrophy.

HENRY H. JORDAN, M.D., Orthopedic Surgeon, Lenox Hill Hospital. NEW YORK.

409. Maintaining Reduction in Oblique Fractures of Long Bones.

JOHN P. STUMP, M.D., Associate in Orthopedic Surgery, New York Post-Graduate Medical School and Hospital. NEW YORK.

410. The Role of Physical Therapy in Fractures.

MILAND E. KNAPP, M.D., Clinical Instructor in Physical Therapy, University of Minnesota Hospital; Director of Physical Therapy, Minneapolis General Hospital. MINNEAPOLIS.

Discussion of foregoing papers: N. H. Polmer, M.D., New Orleans; K. G. Hansson, M.D., New York; George A. Pollock, M.D., Rochester, Minn.; Barbara B. Stimson, M.D., New York.

411. Present Status of Iontophoresis.

PHILIPPE BAUWENS, M. R. C. S.; L. R. C. P., Electrotherapist, St. Thomas's Hospital, and Royal Westminster Ophthalmic Hospital. LONDON.

412. Iontophoresis of Epinephrine in the Treatment of Severe Asthma.

HAROLD A. ABRAMSON, M.D., Assistant Professor of Physiology, College of Physicians and Surgeons, Columbia University; Assistant in Medicine, Mount Sinai Hospital. NEW YORK.

Discussion of foregoing papers: Wm. Bierman, M.D., New York; Joseph Kovács, M.D., New York.

SCIENTIFIC EXHIBITS

DR. H. A. ABRAMSON, Mount Sinai Hospital, New York.

Electrophoresis of epinephrine in asthma: Charts.

DR. D. ADLERSBERG, DR. WM. BIERMAN, and DR. H. SOBOTKA, Mount Sinai Hospital, New York.

Effect of hyperpyrexia on biliary secretion of rabbits.

AMERICAN MEDICAL ASSOCIATION, COUNCIL ON PHYSICAL THERAPY.

Physics of ultraviolet irradiation.

AMERICAN OCCUPATIONAL THERAPY ASSOCIATION.

Charts, photographs, case histories and other objects. The principles of occupational therapy are presented and the results of such treatment are graphically depicted. The objective of the exhibit is to adequately inform the medical profession as to the value of this adjunct of treatment.

AMERICAN PHYSIOTHERAPY ASSOCIATION.

Treatment for cerebral palsy. Posters. Miniature apparatus for education.

AMERICAN REGISTRY OF PHYSICAL THERAPY TECHNICIANS.

Charts of data showing requirements for certification: Standards of education and training of technicians.

S. BEMIS and C. LINDEMAN, Mount Sinai Hospital, New York.

Demonstration of motor points on life-sized models.

DR. MARTHA BRUNNER, Rochester, Minn.

Device for diagnosis and treatment of pathologic conditions of the esophagus.

SIGNE BRUNNSTROM, Hospital for Ruptured and Crippled Children, New York.

Muscle testing around the shoulder girdle. Charts of mounted photographs showing testing positions for the shoulder blade fixators and rather unusual cases of isolated paralysis of these muscles.

DR. JOHN D. CURRENCE, New York Post-Graduate Medical School and Hospital, New York.

Hyperpyrexia survey: An analysis of all the current literature.

DR. H. DOUBILET, and DR. WM. BIERMAN, Mount Sinai Hospital, New York.

The cardiac and common bile duct sphincters during hyperpyrexia.

DR. RALPH S. EMERSON, Meadowbrook Hospital, Hempstead, N. Y.

A portable whirlpool bath: This apparatus utilizes the principles of suction and the waterwheel to create an aerated whirlpool bath.

DR. M. FRIENDLANDER, DR. WM. BIERMAN, DR. S. SILBERT, Mount Sinai Hospital, New York.

Temperature studies in the human calf muscles.

GARLAND COUNTY HOT SPRINGS MEDICAL SOCIETY.

Medical management of various diseases amenable to Spa treatment.

DR. SAMUEL GOTTESMAN and Staff, Beth Israel Hospital, New York.

Static machine with chair, new electrodes, short wave epilation machine.

DR. K. G. HANSSON, Hospital for Ruptured and Crippled Children, New York.

Electromyographic studies: Electromyograph, charts.

DR. A. B. HERTZMAN, and DR. J. B. DILLON, Department of Physiology, St. Louis University School of Medicine, St. Louis, Mo.

Photoelectric plethysmography: Apparatus for taking photoelectric plethysmograms and estimating skin blood supply to be demonstrated. Figures illustrating application of technics to normal and abnormal circulatory conditions and effects of some therapeutic procedures.

DR. O. LEONARD HUDDLESTON, Department of Physiology and Pharmacology, University of Colorado School of Medicine.

Further studies of the influence of artificial fever on the cardiovascular system; graphs, charts and apparatus to illustrate the effects of hyperpyrexia on blood flow and pulse tracings.

DR. MORTIMER N. HYAMS, Columbia University College of Physicians and Surgeons, New York.

Obscure gynecologic conditions: A special cabinet whereby obscure gynecologic conditions are demonstrated by x-rays, colored transparencies of operative specimens and photomicrographs.

DR. HENRY H. JORDAN, Lenox Hill Hospital, New York.

The role of posture in chronic arthritis: Charts, photographs, models, x-ray films, samples of orthopedic appliances.

DR. HENRY H. KESSLER, New Jersey Rehabilitation Clinic, Newark, N. J.

Cineplastic amputation.

DR. DISRAELI KOBAK, and DR. LOUIS B. NEWMAN, Cook County Hospital, Chicago.

Refrigeration therapy in benign and malignant conditions: Cryotherapy (refrigeration treatment) in acute inflammatory benign processes and particularly as an adjuvant in local and metastatic cancer. Demonstration of a new method of controlled intravaginal and topical refrigeration for malignancy of the cervix and other accessible parts.

DR. A. KOLIN, Mount Sinai Hospital, New York.

A new principle in plethysmography.

DR. RICHARD KOVACS, New York Polyclinic Medical School and Hosptial.

Instruction in physical measures: Lantern slides, instruction, clinical use of physical measures.

DR. E. L. LEVY, Mount Sinai Hospital, New York.

Comparison of clinical results obtained following the use of high tensity, low tensity, and no tensity applications of the short wave current.

DR. S. LICHT, Mount Sinai Hospital, New York.

Studies in chronaxie.

DR. J. MARMOR, and K. MARMOR, Mount Sinai Hospital, New York.

Clinical Electroencephalography.

DR. WALTER S. McCLELLAN, and DR. OSKAR BAUDISCH, Saratoga Spa, Saratoga Springs, New York.

Laboratory and clinical studies of the naturally carbonated mineral waters of the Saratoga Spa: Wall charts showing the studies of isotopes and radioactive substances in the waters of the Saratoga Spa. Charts showing the studies of the influence of naturally carbonated baths on the peripheral circulation and other studies of the mineral waters.

DR. MADGE C. L. McGUINNESS, Lenox Hill Hospital, New York.

Climate and health effects on different diseases. Rehabilitation. Treatment — early, delayed, late. Physical measures. Disability. Handicaps. Training.

DR. HENRY W. MEYERDING, Mayo Clinic, Rochester, Minn.

The exhibit illustrates certain of the etiologic factors which are concerned in the production of backache. In order that the maximum of benefit may accrue to the patient a thorough knowledge of these features is essential to the intelligent cooperation of physical therapist, physician and surgeon. Models, photographs and roentgenograms are presented, which demonstrate lesions such as spondylolisthesis, protrusion of an intervertebral disk, arthritis and spondylitis, tuberculosis, and fracture and disease of the facets and vertebral bodies.

DR. EUGEN MITTELMANN, and DR. DISRAELI KOBAK, Rush Medical College of the University of Chicago.

Clinical significance of power measurement in short wave therapy: Practical aspects of power measurements and heat distribution by short wave currents in connection with condenser pads, air-spaced units and induction coils. Demonstration of dosimetry (dosage measurement and control) in connection with living materials and phantom models. Temperature distribution influenced by various technics is illustrated by graphs, charts, curves, and wattage regulation.

DR. HU C. MYERS, The Myers Clinic, Philippi, West Va.

Automatic intermittent irrigation following transurethral resection.

DR. LOUIS B. NEWMAN, and DR. DISRAELI KOBAK, Cook County Hospital, Chicago.

Intravaginal heat treatment by thermostatically controlled air: Practical aspects of the treatment of pelvic inflammations by thermostatically controlled air. Demonstration of a new method of raising, maintaining and controlling local temperature through specially devised soft rubber, inflatable thermophores. Clinical results shown by tables, roentgenograms, charts and demonstration with original apparatus.

DR. S. M. PECK, DR. H. ROSENFELD, and DR. WM. BIERMAN, Mount Sinai Hospital, New York.

Studies in the fungicidal action of sweat: Series of tables and pictures illustrating the constituents of sweat and their correlation to clinical features.

DR. HENRY A. RAFSKY, Lenox Hill and Beth Israel Hospitals, New York.

Peptic ulcer and gastric malignancy — diagnostic criteria in their differentiation: Exhibit of transparencies showing a series of cases in which the differentiation between peptic ulcer and gastric cancer presented diagnostic and therapeutic problems; routine procedures were not as a rule sufficient to make the distinction and in most of the cases special methods of examination were necessary; investigations consisted of x-ray compression and mucosal studies of the stomach, gastroscopy and various laboratory tests.

DR. JOSEPH RESNIK, and DR. MAX RITVO, Boston City Hospital, Boston, Mass.

Pathologic calcifications in relation to joints treated by physical therapy: Original x-ray films illustrating gradual absorption of calcification in subacromial and subdeltoid bursitis; in subscapularis tendon; in hip joint and knee joints (Pellegrini-Stiedas disease). Charts will present data with regard to etiology, symptomatology, treatment and end results.

DR. G. ALLEN ROBINSON, New York Medical College and Flower Hosptial, New York.

Radiation therapy in tumors of the head and neck: Radium and x-ray therapy in the treatment of benign and malignant lesions of the head and neck.

DR. ANNA SAMUELSON, Assistant, Peripheral Vascular Disease Clinic, Morrisania, and Mount Sinai Hospitals; DR. SAMUEL JABLONS, Medical Service, City Hospital; DR. GEORGE SINGER, Peripheral Vascular Disease Clinic, Morrisania Hospital, and DR. MADGE C. L. McGUINNESS, Lenox Hill and Misericordia Hospitals, New York.

General review of physical measures in the diagnosis and treatment of peripheral vascular disease: Oscillometric and skin temperature readings, Landis' test, light, heat, diathermy, etc. Preventive measures. Climatic effects.

DR. SAMUEL SEDWITZ, Youngstown Hospital Association, Vascular Clinic, Youngstown, Ohio.

Diagnosis of peripheral vascular disease: Wall charts depicting classification, tests, etc., and photographs of patients before and after treatment, demonstrations of the use of various apparatus, including the oscillating bed.

DR. LEWIS J. SILVERS, Ocean Hill Memorial Hospital, Brooklyn, New York.

Demonstration of an apparatus (perfected with the aid of Robert Strasser) which affords physiologic rest to respiratory tract.

DR. CHARLES I. SINGER, Medical Division, Health Resort Committee, Long Beach, N. Y.

Rationale of climatic surgery: Charts, graphs, and drawings depicting the biologically effective factors of different types of climate such as: Seashore, desert, high altitude, and subtropical climates. The indications and practical aspects of climatic stimulation — "the challenge" — and of climatic sedation — "the escape."

DR. JOHN P. STUMP, New York Post-Graduate Medical School and Hospital, New York.

Maintaining reduction in oblique fractures of long bones: A simple method of using double Kirschner wires to maintain reduction in oblique fractures of long bones. The method is based on fundamental orthopedic principles and can be used by doctors with minimal experience in fracture treatment and in small hospitals.

DR. B. S. TROEDSSON, New York Hospital, New York.

Experimental hypothermia: Temperature and descriptive charts.

VETERANS ADMINISTRATION.

Charts on physical therapy subjects.

DR. JEROME WEISS, and DR. H. J. BEHREND, Hospital for Joint Diseases, New York.

Modern concepts of prophylactic and corrective exercise: Photographs — medical gymnastics.

DR. F. T. WOODBURY, and DR. A. KOLIN, Mount Sinai Hospital, New York.

Studies of current distribution on a homogeneous phantom.

TECHNICAL EXHIBITS

Space No. 67

THE ADLANCO X-RAY CORPORATION.

One of the outstanding features of the exhibit will be the "ORIGINAL SIEMENS ULTRATHERM" of which thousands are being used by the medical profession. Eminent authorities have obtained their outstanding results with this unit. Ask for illustrated catalog.

THE "HELIOSPHERE," the smallest yet most powerful x-ray unit of its size is another feature. It is suitable for both fluoroscopy and radiography. It is shock and ray proof.

Space No. 56

AMERICAN HOSPITAL SUPPLY CORPORATION.

Featured in the American Hospital Supply Corporation exhibit will be the Vasoscillator or Sanders motorized bed which is successfully used as an adjunct to the therapy for peripheral vascular diseases. The equipment may now be obtained with an ingenious pressure device coordinated with the cycles of the oscillating bed. The patient may receive intermittent venous occlusion treatment while he receives continuous rhythmic postural change. Be sure to see this interesting development.

Space No. 48

AMPEREX ELECTRONIC PRODUCTS, INC.

The display of transmitting tubes suitable for short-wave diathermy operation, ranging in power from 50 watts up to 1000 watts output.

Space No. 64

ARCHIVES OF PHYSICAL THERAPY.

The outstanding publication devoted exclusively to physical therapy. Subscriptions to the journal or membership in the Congress will be taken by one of the assistants to the Executive Secretary.

Space No. 43 and 44

BEDFORD SURGICAL COMPANY, INC.

This exhibit will feature the full *CONTINENTAL* brand of physical therapy and x-ray equipment, including 4 models of short wave diathermy, the mercury-quartz type of ultraviolet lamp, the new Galva-Sine low volt outfit, shockproof fluoroscope, new shockproof portable x-ray unit, and the new shockproof tilt table unit.

Space No. 23 and 24

J. BEEBER COMPANY.

Will exhibit a complete line of Fischer Corporation Physical Therapy equipment including short wave apparatus, sinusoidal and galvanic machines, and cold quartz lamps. Be sure to see our dual wave short wave apparatus.

Space No. 50 and 51

THE BURDICK CORPORATION.

The Burdick Corporation will display a complete line of the newer developments in Physical Therapy Equipment. Doctors and Physical Therapy Technicians are invited to register for the "Syllabus"—a periodical of current abstracts on physical therapy.

Space No. 69

THE CAMERON SURGICAL SPECIALTY COMPANY.

See the new improved Cameron Electro-Diagnostoset, the Color-Flash Clinical Camera, the combination Projecto-ray Diagnostic & Operating Lamp and Projector, the office model Radio-Frequency Cauteradio, and the heavy-duty Cauterodyne for all phases of electrosurgery and electrocoagulation.

Space No. 59

CLAY-ADAMS COMPANY, INC.

Models of arm, leg and face showing accurately all motor points, as made for Dr. Wm. Bierman, at reasonable prices—skeleton with muscle attachments painted in, and other models, charts, and specimens of particular interest in this specialized field.

Space No. 72

THE COCA-COLA COMPANY.

Coca-Cola will be served to the delegates with the compliments of the Coca-Cola Company.

Space No. 7

THE DIERKER COMPANY—MANUFACTURERS.

Dierker Therapeutic Apparatus for administering treatments and medication to accessible cavities; reprints of scientific papers by eminent clinicians, who are users of the Dierker Apparatus, will be available upon request. Ask your local dealer to supply you.

Space No. 22

J. H. EMERSON COMPANY.

The new Emerson Fever Cabinet will be presented for the first time. This cabinet provides 100 per cent humidity and is equipped with many new features for the convenient care of the patient. The Emerson Vascular Boot and several other products of this company will also be shown.

Space No. 57 and 58

H. G. FISCHER & COMPANY.

New models of apparatus will include the FISCHER Model "G" Shockproof Fluoroscope with radiographic facilities that has created such a sensation, and the new FISCHER Galvanic and Contractile Currents Generator. Included also will be other models of x-ray, short wave and ultraviolet apparatus.

Space No. 54 and 55

GENERAL AUTOMATIC CORPORATION.

The General Automatic Corporation has completed its new large plant at Macedonia, Ohio, (Cleveland). Its engineers have designed the new and outstanding "Driflash" (desiccation and fulguration apparatus), the new air-spaced single disc drum on arm to be used on short waves having only plate condenser type electrodes, as well as our new, distinctive Infra-Red Lamp, together with a complete line of automatic short wave equipment, all of which will be displayed at the American Congress of Physical Therapy.

Space No. 1, 2 and 3

GENERAL ELECTRIC X-RAY CORPORATION.

Exhibit will include the Inductotherm, as used for various types of localized treatments; the G-E all-metal air-conditioned fever cabinet, used in conjunction with the Inductotherm for therapeutic fever; the new Model F Ultraviolet lamp; the portable electrocardiograph; and the new electro-surgical unit.

Space No. 35

GYRO BRUSH COMPANY.

Gyro Portable Whirlpool Brush: This is a scientifically designed instrument for treatment of infections of the extremities. It is a practical, effective, and inexpensive method of utilizing the therapeutic value of whirling aerated water. The apparatus is portable, light, simple and applicable for office or home use.

Space No. 60

HANOVIA CHEMICAL & MFG. COMPANY.

The very latest equipment displayed — self-lighting hot quartz ultraviolet lamps, Short and Ultra Short apparatus, Sollux Radiant Heat Lamps. Inquire about our special proposition.

Space No. 62 and 63

HAROLD SURGICAL CORPORATION.

Will display the latest models of Beck-Lee Electrocardiographs. Also a complete line of Cold and Hot Quartz Ultraviolet Ray Lamps, carbon arc lamps, infra-red lamps, fluoroscope, portable x-ray and other physical therapy apparatus. Will also feature a complete line of McKesson Appliance Company apparatus.

Space No. 65

HOLLAND-RANTOS COMPANY.

A motion picture demonstration of interest will be at the Holland-Rantos Booth, together with a display of their products, the Koromex diaphragm and jelly and their newer items, the H-R Emulsion jelly and Koromex Diaphragm Introducer. Call for a complimentary copy of the Physicians' Guide, a valuable manual for the physician.

Space No. 6
C. COY HONSAKER.

The latest equipment in hydrotherapy, as embodied in the Honsaker Colonic Lavagatory, for cleaning and treating the colon and the Honsaker Hydro-Eneciator, for inducing fever. Induces fever, controls fever and distributes fever safely.

Space No. 4
THE ILLE ELECTRIC CORPORATION.

The Ille Electric Corporation will demonstrate how the care of infantile paralysis and arthritis patients can be improved by underwater therapy with hydro-massage. Will also display an improved Portable Whirlpool Bath and a Thermostatically Controlled Bed Tent.

Space No. 33
PAUL E. JOHNSON, MANUFACTURERS.

New type short wave apparatus will be featured. In addition there will be shown every type of physical therapy equipment suitable for the physician's office or for the hospital. The wide price range of complete units will appeal to every physician.

Space No. 34
JONES METABOLISM EQUIPMENT COMPANY.

The Jones MOTOR-BASAL eliminates corrections for barometric pressure and room temperature, and eliminates calculations. It is simple to run yet accurate enough to meet the most exacting requirements of research laboratories. An exclusive geometric device checks the accuracy of each test. The Jones MOTOR-BASAL is guaranteed to perform with an accuracy greater than 99 per cent for the lifetime of the purchaser.

Space No. 32
THE KITCHEN KATCH-ALL CORPORATION.

There will be demonstrated the "Vapor-All" ALL-NITE vaporizer; medicated or plain vapors continuously for 12 hours or less. Also a Miniature Formula and Sterilizer Outfit for the Mother and baby at home, providing the same protection to baby as in the hospital. Known as "Baby-All." Ask for demonstration.

Space No. 5
LEA & FEBIGER.

Booth will be in charge of A. S. Levy. There will be exhibited new editions of Kovács' "Electrotherapy and Light Therapy"; Mackee on "X-Rays and Radium in the Treatment of Diseases of the Skin"; Pemberton on "Arthritis and Rheumatoid Conditions"; McCurdy's "The Physiology of Exercise". Among the new works shown are Thorndike's "Athletic Injuries"; Stimson's "A Manual of Fractures and Dislocations"; Pohle's "Theoretical Principles of Roentgen Therapy and Clinical Roentgen Therapy"; Haden's "Principles of Hematology"; Hawley's "Kinesiology of Corrective Exercise" and Kovács' "Physical Therapy for Nurses."

Space No. 10 and 11
LEPEL HIGH FREQUENCY LABORATORIES.

A complete line of Short Wave equipment as shown by the Lepel High Frequency Laboratories, including both the quenched spark gap type and the full rectified tube type, also the improved model ultraviolet lamp and moderate priced combination galvanic sinusoidal and faradic apparatus. The Lepel Laboratories are distributors also for the Dierker Therapeutic apparatus. Shockproof x-ray is also shown by the Lepel Laboratories.

Space No. 42
R. J. LINDQUIST COMPANY.

Be sure to see the improved Chronaximeter, and the Research and Standard Chronowave instruments. Other items to be featured include short wave, infra-red, and ultraviolet equipment.

Space No. 45 and 46
THE LIEBEL-FLARSHEIM COMPANY.

Will exhibit new models of the well-known L-F Short Wave Generators, also the famous line of Bovie Electro-Surgical Units. In addition, other new and useful physical therapy apparatus will be shown, including the new L-F Hypertherm, the all air-conditioned fever cabinet. Ask for demonstration.

Space No. 71
McINTOSH ELECTRICAL CORPORATION.

The McIntosh Electrical Corporation, celebrating "Sixty Years Serving the Profession" will show the latest models of Council accepted "Brevatherms" (Short Wave Diathermies), the Biolite Infra-red lamps and other physical therapy equipment. Representatives will be glad to answer all questions and give demonstrations.

Space No. 36
MOORADIAN HIGH FREQUENCY LABORATORIES.

Will present the Model C Short Wave Unit, an outstanding achievement in short wave apparatus. Perfect control and performance of the electromagnetic field, electrostatic field, orificial electrode circuit, and an unsurpassed surgical circuit make this an outstanding apparatus. Sinusoidal and galvanic units of new design will be demonstrated.

Space No. 68
NATIONAL CARBON COMPANY, INC.

Exhibit and demonstration of the newest models and latest developments in "National" Professional Model Carbon Arc Lamps for light therapy. These modern units are designed around a new principle of carbon arc operation. Intense ultraviolet, close duplication of natural sunlight or strong infra-red radiation available from the same lamp, merely by changing the type of carbon.

Space No. 52
ROBERT K. OSBORNE.

The COOLEY COMPRESS is a new apparatus for maintaining hot compresses at constant temperature. It can be used in the treatment of all conditions requiring the application of hot-wet dressings. Keeps temperature constant at skin surface, and flannel compresses will stay moist from 10 to 12 hours without changing.

Space No. 37
OXFORD UNIVERSITY PRESS.

Complete line of up-to-date medical publications featuring Blech's new "Clinical Electrosurgery".

Space No. 70
PEERLESS LABORATORIES, INC.

See the new MULTRASCOPE which gives you ALL your x-ray and fluoroscopy at half cost. Advanced, precision built, ultra short wave equipment provides all known technics.

Space No. 49
PHILIP MORRIS & COMPANY, LTD., INC.

Philip Morris and Company will demonstrate the method by which it was found that Philip Morris Cigarettes, in which diethylene glycol is used as the hydroscopic agent, are less irritating than other cigarettes. Their representatives will be happy to discuss researches on this subject, and problems on the physiologic effects of smoking.

Space No. 52
SHARK INDUSTRIES, INC.

SHARKOL is a biologically standardized product of shark liver oil containing a minimum of 16,500 U. S. P. XI units of Vitamin A and 40 U. S. P. XI units of Vitamin D, per gram. It has a high ratio of Vitamin A to D and should be found useful where the benefits of Vitamin A are desired without the alterations in the calcium and phosphorus metabolism produced by Vitamin D. It is dispensed in liquid and capsule form.

Space No. 9
THERMO-ELECTRIC COMPANY.

Paraffin Baths, electrically heated and controlled, have been developed in cooperation with the Cleveland Clinic and used continuously for several years in the Cleveland hospitals. The perfected positive controls keep the Bath ready for use at all times. Beautifully finished in Chrome Plate Steel. Used whenever heat application is indicated for the extremities.